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FMC Corporation

Phosphorus Chemicals Division

RCRA Part B Permit Application

March 1, 1991

Pocatello

Submitted to EPA Region X

Volume 5
Sections I - L

FMC Corporation

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Sections I – L

Copy 2

**FMC Corporation
Elemental Phosphorus Manufacturing Plant
RCRA Part B Permit Application**

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Facility Name: FMC

EPA ID #: FD 9518

*CBI Material
on this Facility in
WMB Safe*

SECTION I, ATTACHMENT 2

APPENDIX A

**TASK-SPECIFIC HEALTH AND SAFETY PLAN FOR
PHASE IV PONDS CLOSURE ACTIVITIES**

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Section 1

INTRODUCTION

This Health and Safety (H&S) Plan addresses the health and safety issues associated with the closure activities of the Phase IV Ponds. This plan is an appendix to the Closure Plan for the Phase IV Ponds, and is based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER), and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/EPA¹, October 1985, Pub. No. 85-115.

Although this plan is task-specific with regard to the planned closure activities, some flexibility shall be allowed to cover unforeseen conditions that may arise. All personnel involved in these activities are required to follow this Health and Safety Plan. They are required to undergo all FMC Plant H&S Training to comply with existing FMC Plant Safety Policies. FMC's Safety Plan and Incident Response Plan will also apply and must be followed during the entire Phase IV Ponds closure activities.

¹ NIOSH = National Institute of Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; USCG = United States Coast Guard; EPA = Environmental Protection Agency.

Section 2

SCOPE OF WORK

The Closure Plan for the Phase IV Ponds calls for closing the ponds as a hazardous waste landfill. A water layer will be maintained over the existing pond solids as it is being backfilled. A subgrade will be placed over the backfill, and an EPA-recommended cover will be placed over the subgrade.

The Phase IV Ponds closure activities will involve material-handling activities which may disturb sediments containing elemental phosphorus. In the presence of air, elemental phosphorus may oxidize creating a fire and potential burn hazard as well as giving off phosphorus pentoxide (P_2O_5). To minimize the potential exposure to the hazards of elemental phosphorus, special safety precautions will be taken, personal protective equipment/clothing will be used, and good personal hygiene practices will be required.

Section 3

HAZARD ASSESSMENT

3.1 Chemical Hazards

Although the Phase IV Ponds received non-hazardous process streams since September 1, 1993, a residual bottom sediment layer may be present, which contains hazardous substances from an earlier use of the ponds. The primary constituents of concern during the closure process are elemental phosphorus and its oxidation product, phosphorus pentoxide. Other possible constituents are heavy metals. These chemicals can enter the body by inhalation, ingestion, or absorption through the skin. Some chemicals can enter the body by more than one route and may cause damage at the site of contact or to target organs in the body.

3.1.1 Elemental Phosphorus

Oxidation of elemental phosphorus produces P_2O_5 fumes that may be encountered during grading and excavation activities in the work zone.

Elemental phosphorus itself is considered a poison and is acutely and chronically toxic if inhaled or ingested. Skin, eye, and other mucous membrane exposure to elemental phosphorus should be avoided because of the irritating and burning effects on the tissues.

Phosphorus pentoxide reacts with water in the air and on the mucous membrane surfaces of the eyes, nose, throat, or lungs to form phosphoric acid, which can cause severe irritation. Respirators will be worn if personnel encounter visible amounts of phosphorus pentoxide (white smoke), or if workers experience a scratchy throat or other evidence of irritated mucous membranes, such as coughing or sneezing.

Symptoms of acute exposure to elemental phosphorus and phosphorus pentoxide include: vomiting, generalized weakness, retinal hemorrhaging, and other associated visual disorders.

Symptoms of chronic exposure to elemental phosphorus and phosphorus pentoxide include: general weakness, anemia, and skeletal system degeneration (especially a condition known as "phossy jaw," whereby necrosis of the jaw occurs). Any employee with dental work that opens pathways to the jaw, such as tooth extractions within the past 30 days, will not be allowed to work on the site.

Permissible exposure limits, routes of entry, irritant classification, and potential effects from exposure to these two compounds are indicated in Table A-1. Personal protective equipment/clothing will be used and good personal hygiene practices will be required.

3.1.2 Heavy Metals

Arsenic, cadmium, chromium, lead, and other heavy metals may be encountered in soils and waste streams during closure activities. Inhalation, dermal contact, and ingestion are potential routes of entry for exposure to these metals. Permissible exposure limits, routes of entry, irritant classification, and potential effects from exposure to these metals are indicated in Table A-1. To minimize the potential for exposure, personal protective equipment/clothing will be used and good personal hygiene practices will be required.

3.2 Biological Hazards

The main biological hazards of concern at the FMC facility are rattlesnakes, bees and wasps, black widow spiders, and ticks. In most cases, these hazards will be encountered only in site areas where tall brush, rocks, and debris are present. Such encounters are likely to be minimal near the Phase IV Ponds. Personnel with known allergic reactions to insect stings will be identified and supervisors made aware of this accordingly.

3.3 Physical Hazards

Physical hazards associated with the pond closure activities are those associated with heavy equipment operation and handling: equipment cleaning activities; high noise levels; slipping, tripping, and falling hazards; temperature extremes that can cause sunburn and heat stress, frost bite and hypothermia; utilities (overhead and underground); fire and smoke hazards; and traffic inside the FMC plant. The risk of accident or injury due to these hazards can be minimized by observing the proper safety measures, using common sense, paying attention to the task being performed and to the conditions present in the work place, and by following current plant safety policies and practices for those hazards and the requirements set forth in this task-specific H&S Plan.

Table A-1
POTENTIAL EFFECTS OF CHEMICALS THAT MAY BE PRESENT
AT THE FMC, POCATELLO, FACILITY

Chemical	PEL (a)	Route of Entry (f)	Irritant	Potential Effects	
				Acute	Chronic
Arsenic and compound (as As)	0.01 mg/m ³ 0.002 mg/m ³ NIOSH(c)	INH, ING, C	Medium	Headache, nausea	Skin pallor, exacerbation of acute symptoms
Barium (soluble compound as Ba)	0.5 mg/m ³	INH, ING, C	Medium	Muscle spasms, skin burns, irritation of eyes	
Beryllium and compounds	0.002 mg/m ³ 0.005 mg/m ³ ceiling	INH, ING, C	High	Irritation of the eyes, resp. system, and skin	Respiratory symptoms, weakness, fatigue, weight loss, cancer
Cadmium (dust)	0.005 mg/m ³	INH, C	Medium	Headache, cough, tightness of chest, nausea, diarrhea, muscle aches	Pulmonary edema, mild anemia, emphysema
Chromium insoluble (as Cr VI)	0.05 mg/m ³ (d)	INH, ING, C	Medium		Histologic fibrosis of lungs, Cr (VI) carcinogen (H ₂ O insol.)
Cobalt metal fumes and dust	0.05 mg/m ³	INH, ING, C	Medium	Cough, irritation of eyes	Decreased pulmonary function, weight loss, dermatitis
Fluorides	2.5 mg/m ³	INH, ING, C	High	Irritation of eyes and resp. system, nausea, abdominal pain, excess salivation	Stiff spine, calcification of ligaments of ribs, pelvis

Notes:

- (a) PEL: Permissible exposure limit (OSHA 8-hour time-weighted average).
- (b) Short-term exposure limit (STEL).
- (c) NIOSH-recommended exposure limit.
- (d) ACGIH: American Conference of Government Industrial Hygienists.
- (e) 8-hour time-weighted average.
- (f) INH: inhalation; ING: ingestion; C: dermal contact.

Table A-1 (Cont'd)

Chemical	PEL (a)	Route of Entry (f)	Irritant	Potential Effects	
				Acute	Chronic
Iron (oxide fume)	10 mg/m ³ STEL	INH	Low		Benign pneumoconiosis, X-ray indistinguishable from fibrotic pneumoconiosis
Lead inorganic fumes and dust (as Pb)	0.05 mg/m ³	INH, ING, C	Medium	Insomnia, exhaustion, paleness, abdominal pain	Anorexia, colic, anemia, gingival lead lines, CNS and peripheral nerve damage
Magnesium (dust)	10 mg/m ³	INH, C	Medium	Irritation of eyes and nose; cough	Flu-like fever, chest pain
Manganese and compounds	5 mg/m ³ ceiling	INH, ING	Low	Dry throat, cough, tight chest, rales, vomit, fatigue	Parkinson's, metal fume fever, insomnia
Mercury (inorganic)	0.1 mg/m ³ ceiling	INH, ING, ABS, C	Medium	Cough, dyspnea, irritation of eyes and skin	Insomnia, headache, tremor, bronchitis, pneumonia, fatigue, weight loss
Molybdenum (soluble compounds)	5 mg/m ³	INH, ING, C	Medium	In animals: irritation of eyes, nose, throat	In animals: loss of appetite and coordination; anemia, abdominal pain, joint inflammation
Nickel and compounds (soluble)	0.10 mg/m ³	INH, ING, C	Medium	Allergic asthma, irritates nasal cavity	Sensitized dermatitis, pneumonitis, cancer
Nitric acid	2 ppm TWA ^(e) 4 ppm STEL	INH, ING, C	High	Irritation of eyes, mucous membranes, skin	Delayed pulmonary edema, pneumonitis, bronchitis, dental erosion

Notes:

- (a) PEL: Permissible exposure limit (OSHA 8-hour time-weighted average).
- (b) Short-term exposure limit (STEL).
- (c) NIOSH-recommended exposure limit.
- (d) ACGIH: American Conference of Government Industrial Hygienists.
- (e) 8-hour time-weighted average.
- (f) INH: inhalation; ING: ingestion; C: dermal contact.

Table A-1 (Cont'd)

Chemical	PEL (a)	Route of Entry (f)	Irritant	Potential Effects	
				Acute	Chronic
Nuisance Dust Total	15 mg/m ³	INH	Low	Irritation of respiratory tract Irritation of respiratory tract	Pneumoconiosis
Respirable fraction	5 mg/m ³	INH	Low		
Phosphine (gas)	0.3 ppm TWA 1 ppm STEL(b)	INH	High	Nausea, vomiting, abdominal pain, diarrhea, chest pressure, muscle pain	Respiratory problem
Phosphoric acid	1 mg/m ³ TWA 3 mg/m ³ STEL(b)	INH, ING, C	High	Irritation of upper respiratory tract and eyes; burns skin	Dermatitis
Phosphorus (elemental)	0.1 mg/m ³	INH, ING, C	High	Irritation of eyes and respiratory tract, burns skin and eyes, abdominal pain, dental and jaw pain, excess salivation, nausea, jaundice	Cachexia
Phosphorus pentoxide	Not published	INH, C	High	Irritation of eyes, mucous membranes, skin	Stomach hemorrhages, calcium metabolism disturbance
Selenium compounds	0.2 mg/m ³	INH, ING, C, ABS	High	Irritation of eyes, nose, and throat; disturbed vision	Liver and thyroid cancer, depression, digestive disturbance
Silica (amorphous)	6 mg/m ³	INH	Medium	Irritation of eyes, respiratory tract	Pneumoconiosis
Silica (crystalline quartz)	0.1 mg/m ³	INH	Medium	Irritation of eyes, respiratory tract	Silicosis
Silver (metal and soluble compounds)	0.01 mg/m ³	INH, ING, C	Medium	Irritation of skin	Blue-gray eyes, nasal septum, skin, throat, skin ulceration
Sulfuric acid	1 mg/m ³	INH, ING, C	High	Irritation of eyes, nose, throat; burns skin	Pulmonary edema, conjunctivitis, tracheobronchitis

Notes:

- (a) PEL: Permissible exposure limit (OSHA 8-hour time-weighted average).
- (b) Short-term exposure limit (STEL).
- (c) NIOSH-recommended exposure limit.
- (d) ACGIH: American Conference of Government Industrial Hygienists.
- (e) 8-hour time-weighted average.
- (f) INH: inhalation; ING: ingestion; C: dermal contact.

3.3.1 Heavy Equipment/Equipment Cleaning Activities

In all cases, heavy equipment with rotating shafts or gears should be covered or guarded to prevent accidental contact. In some cases, where rotating parts cannot be adequately guarded, only experienced/qualified operators will be allowed to operate and work around this equipment. Special precautions will be observed during excavation or heavy equipment operation and handling to avoid potential accidents due to equipment operation (i.e., use of operator seat belts, properly operating safety devices such as back-up alarms, no loose fitting clothing, etc.) Work zone delineations (i.e., Exclusion Zones and a Contamination Reduction Zone) will be maintained around the Phase IV ponds during the closure activities.

A truck or trailer-mounted engine or generator may be used to operate a high-pressure steam cleaner to decontaminate heavy equipment during work activities. The hazards associated with steam cleaning are electrical and thermal burns.

3.3.2 Noise

Personnel who are exposed to noise levels greater than 85 dBA in the work zone will be required to wear hearing protection. When backfilling, grading, excavation, heavy equipment operation, or equipment cleaning activities are in progress, hearing protection will be worn. Training and hearing protection, as required by 29 CFR 1910.95, shall be provided as needed.

3.3.3 Slipping, Tripping, and Falling Hazards

The pond closure area may contain various hazards that can cause slipping, tripping, and falling. Some of these include tools, cleaning equipment, cables, and ropes, etc. Some areas where slipping hazards could occur are wet surfaces in the work area, decontamination area, and personnel decontamination area. To minimize the risks, housekeeping of the work place will be of the utmost priority and will be conducted every day. If snow, rain, or ice become a hazard, work will be stopped until the area has been properly shoveled, drained, or has sufficiently dried to allow work to continue without further endangering the workers to slipping hazards. Personnel will be provided with safety harnesses and lanyard (fall protection) for work activities that exceed 6 feet above ground on unguarded work surfaces/platforms, as per 29 CFR 1926.104.

3.3.4 Temperature Extremes

Heat stress may be a hazard during hot weather and may be intensified when workers are required to wear protective clothing. Workers will be required to take breaks, as needed, and will be encouraged to consume adequate quantities of liquid. Potable drinking water will be available in the Support Zone at the work area. Workers will be briefed on the symptoms of heat-related problems such as heat rash, heat cramps, heat exhaustion, and heat stroke. All workers are responsible for self-monitoring as well as looking out for their coworkers when heat stress conditions occur. The Site Health and Safety Officer (SHSO) will be immediately notified of all heat-stress-related conditions.

The SHSO has the authority to suspend work when low temperatures (with consideration of the wind chill factor) occur, or snow or rain are falling and work place conditions become hazardous to personnel. Any combination of these hazards could cause personal discomfort in the extremities of the body or possibly equipment failure. Each worker is responsible for self-monitoring as well as looking out for their coworkers when these conditions occur. The SHSO will be immediately notified of hypothermia and/or cold- or wet-weather-related safety conditions.

3.3.5 Utilities

If pond closure work is in close proximity to overhead, surface, and underground utilities, management and work crew personnel will exercise every precaution and safe practice to ensure avoidance of these utility lines (i.e., pipelines, electrical conduit, and wires). Measures will include:

- A complete review of engineering or physical plant plans associated with travel routes to/and from work locations.
- Use of appropriate underground utility detection equipment as necessary.
- Confirmation of information with appropriate FMC facilities personnel.
- No operation of crane or boom equipment within 25 feet of any energized overhead power lines.

All management and work crew personnel will be briefed as to the location of all utilities.

Pond sediment or soil-intrusive, subsurface, or otherwise pond sediment- or soil-disturbing work, and any below-grade work will only be conducted under a current and approved Hazardous Work Permit (HWP), and under the direct supervision of the appropriate FMC Project Manager. A copy of the HWP is provided in Figure A-1. The HWP will be filled out by the appropriate FMC work supervisor, but must be approved and signed by the SHSO as well as the appropriate FMC project management personnel. A separate HWP will be clearly posted at each work location.

The movement and stationing of heavy equipment, as well as the locations of all cranes, will be carefully planned and coordinated with the appropriate FMC project management and facilities personnel. HWPs will be obtained from FMC project management prior to equipment moving on site and before beginning any pond sediment- or soil-intrusive work. If any below-grade work is necessary, a separate Confined Spaces Entry Permit must be obtained and attached to the HWP from the appropriate FMC Project Manager. A copy of the Confined Spaces Entry Permit is provided in Figure A-2. This permit will be filled out using the same protocol as the HWP.

3.3.6 Fire and Smoke Hazards

Fire and smoke are serious hazards caused by the presence of elemental phosphorus. Any fire and smoke should be dealt with immediately before work is continued. Elemental phosphorus burns (oxidizes) when supplied with oxygen, as discussed in the Chemical Hazards section previously. Phosphorus pentoxide can also react with water to produce phosphoric acid as discussed in the Chemical Hazards section previously. The product material is handled and stored under water at the FMC facility to preclude this reaction effectively. However, exposure of work crew personnel to elemental phosphorus in a solid state could occur during sediment or soil-disturbing activities if a pocket of elemental phosphorus is encountered. Exposing any elemental phosphorus containing waste material to air may cause it to oxidize.

If fire and/or smoke are observed during pond work or grading, work will immediately be stopped and water applied. The material will either be placed in Pond 16S or will remain in place and covered with soil and/or slag, whichever is reasonable as determined by the cognizant FMC Project Manager. All work activities must comply with FMC Plant Safety Policies and Standards (Pocatello Ref.

FMC - POCATELLO
HAZARDOUS WORK PERMIT

Date _____

1. Location and name or number of unit _____
2. Purpose of Work _____
3. ELECTRICAL ISOLATION:
Have electrical breakers been locked and tagged out? Yes _____ No _____ Not Applicable _____
List electrical breakers locked and tagged out: _____

4. VALVE ISOLATION:
Inlet Valves: Blocked _____ Blanked _____ Locked/Tagged _____ Not Applicable _____
Outlet Valves: Blocked _____ Blanked _____ Locked/Tagged _____ Not Applicable _____
5. Has unit been cleaned or purged? Yes _____ No _____ Not Applicable _____
List how unit was cleaned or purged and by whom _____

6. Has an atmospheric check been made? Yes _____ No _____ Not Applicable _____
If yes, list the tests made and results _____

7. Is a special safety procedure involved in this job? Yes _____ No _____
If yes, what is this procedure? _____

8. Will a safety observer be standing by? Yes _____ No _____
9. Check safety equipment necessary:

	Yes	No		Yes	No		Yes	No
a. Safety Mat			h. Rubber Boots			o. Fresh Air Mask		
b. Safety Glasses			i. Rubber Pants			p. Emergency Breathing		
c. Face Shield			j. Aluminum Coat			q. Safety Harness		
d. Welding Shield			k. Aluminum Pants			r. Warning Signs		
e. Safety Shower/Tub			l. Dust Respirator			s. Barricades		
f. Gloves			m. Chemical Respirator			t. Fire Extinguisher		
g. Rubber Gloves			n. Charged Water Hose			u. Other (list)		

10. Safety Remarks: _____

11. Approval Signatures:
Operator _____
Unit Manager/Delegate _____
Maintenance Foreman/Delegate _____

DISTRIBUTION: WHITE - Safety Office PINK - Operating Supervisor BLUE - Maintenance Supervisor

Figure A-1 Hazardous Work Permit

INSPECTIONS AND TESTS FOR ENTRY INTO CONFINED SPACES

Date _____
Job Number _____
Page _____ of _____

Division: _____ Division Location: _____
Customer: _____ Customer Address: _____
General Job Location: _____ Tank Or Vessel No. / Name: _____
Describe Material In Space: _____
Description Of Work Planned: _____ Chemicals Introduced Into Space: _____

TIME	TESTS							OTHERS			ATMOSPHERE CLASS	INITIAL
	PERCENT LOWER EXPLOSION LIMIT	PERCENT OXYGEN	BENZENE (ppm)	TOLUENE (ppm)	XYLENE (ppm)	H ₂ S (ppm)	CO (ppm)	(ppm)	(ppm)	(ppm)		

CHECK LIST	Initial	PERSONNEL PROTECTIVE EQUIPMENT
	Yes	Does Not Apply
All lines leading to and from confined space have been blinded or disconnected. _____		EYES <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Face Shield <input type="checkbox"/> Safety Glasses
Electrical service disconnected or locked out. _____		EXTREMITIES <input type="checkbox"/> Hard Hat <input type="checkbox"/> Gloves <input type="checkbox"/> Boots <input type="checkbox"/> PVC <input type="checkbox"/> Resistant <input type="checkbox"/> Hoods <input type="checkbox"/> PVC <input type="checkbox"/> Resistant <input type="checkbox"/> Foot Coverings, Disposable <input type="checkbox"/> Laces <input type="checkbox"/> White Socks
All grounding and bonding cables in place. _____		BODY <input type="checkbox"/> Encapsulating Suit <input type="checkbox"/> PVC <input type="checkbox"/> Rubber <input type="checkbox"/> Heavy Suit <input type="checkbox"/> PVC <input type="checkbox"/> Resistant <input type="checkbox"/> Intermediate Suit <input type="checkbox"/> PVC <input type="checkbox"/> Other <input type="checkbox"/> Light Suit <input type="checkbox"/> PVC <input type="checkbox"/> Other <input type="checkbox"/> Tyvek Suit <input type="checkbox"/> White <input type="checkbox"/> Yellow <input type="checkbox"/> Silver
All lighting, fittings, and extension cords are approved explosion proof equipment. _____		RESPIRATORY <input type="checkbox"/> Self-Contained Respirator <input type="checkbox"/> Air Line Respirator <input type="checkbox"/> Air Line W/Egress <input type="checkbox"/> Cartridge Respirator Cartridge Type _____
Ground Fault Circuit Indicator (GFCI) checked and functioning. _____		OTHER <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Parachute Harness and Lifeline (Top Entry) <input type="checkbox"/> Chest Harness and Lifeline (Side Entry)
All ignition sources have been isolated. _____		
Breathing supply and alarms checked and are in proper condition. _____		
The complete respiratory supply system has been checked and is in proper condition. _____		
All safety harnesses and life lines checked and in proper condition. _____		
Required protective clothing, gloves, boots, etc., being used. _____		
Employees have been trained in the use, care, and limitations of their respiratory protective equipment. _____		
Outside safety watch trained in emergency procedures and resuscitation. _____		
Vessel contains leaded product. _____		
All emergency systems such as air packs, fire extinguishers, backup breathing supply, alarms, etc., ready for use. _____		
Special warning / caution signs posted. _____		
Ventilation equipment in use. _____		
No employee with facial hair, eye glasses, or other gas tight seal obstructions will do work which requires a respirator, or act as emergency standby. _____		
Employees will not wear contact lenses in an atmosphere where a respirator is required. _____		

Special Instructions: _____

Qualified Person: _____
Name Printed _____ Signature _____ Date _____
Manager _____ Os _____

ITC FORM 9531 - 1C (8/85)

Figure A-2 Confined Spaces Entry Permit

2.5.1; Attachment A-3), "Minimum Mandatory Standards for Phosphorus." Standards are presented for:

- Personal Protective Equipment
- Line Breaking and/or Entering Phosphorus Equipment
- Training
- Safety Accountability, Enforcement, and Discipline
- Drills
- Marking of Dangerous Areas
- Identification of Phosphorus Lines
- Flange and Pump Seal Covers and Flange Gaskets
- Phosphorus Loading/Unloading Areas
- Safety Showers and Tubs
- Phosphorus Line Unplugging
- Line Purge Procedures
- Pressurized Lines, Vacuum Brakers, and Traps
- Inspection of Phosphorus Lines
- Communications

Fire protection and prevention with respect to use and storage of flammable or combustible materials, fuel, or other substances will be in accordance with OSHA handling and storage requirements and special procedures set forth by the manufacturer, as shown on the Material Safety Data Sheet (MSDS). It is not anticipated however, that any flammable materials and/or fuel will be stored at the closure area.

Personnel will immediately report all fires to FMC Security, regardless of size or damage incurred to the area where the fire occurred.

All heavy equipment, cranes, site vehicles, and all other internal-combustion-powered equipment will be equipped with a 10 lb. carbon dioxide or dry chemical ABC-rated fire extinguisher. These fire extinguishers will be used only on

equipment fires of a nonphosphorus origin (i.e., only on mechanical or related fires such as grease, oil, gasoline, or other combustible material).

3.3.7 Traffic

All FMC traffic rules will be strictly adhered to and enforced. Where congestion or existing plant traffic patterns demands, FMC will provide all equipment and personnel (cones, warning signs, reflective safety vests, barricade tape, flagging, and flag men, etc.) to conduct the work safely.

FMC facility speed limits will be followed and vehicle right-of-way will be given in all cases to emergency vehicles, hauling vehicles, and cranes.

3.4 Hazard Assessment Summary

Given the hazards or hazardous situations noted above, it appears that any situation can be adequately controlled. Physical hazards will be minimized by educating workers of potential hazards, use of protective equipment, and limiting access to the area. Chemical hazards can be reduced or controlled by close supervision and educating workers in the hazards, use of protective equipment supplemented with air monitoring, and implementation of safe work practices. Hazard assessment will be included in the Site-Specific Health and Safety Orientation prior to employees commencing work on the site.

Section 4

AIRBORNE DUST AND CONTAMINANTS

Excavation and heavy equipment operation activities during the closure of the Phase IV Ponds have the potential of generating airborne fugitive dust. To mitigate the potential adverse effects to local air quality during closure activities, the following measures will be taken:

- Fugitive dust will be controlled by applying water spray to dust generating areas, sufficient to reduce dust. NIOSH or Mine Safety and Health Administration (MSHA)-approved, air-purifying respirators equipped with a combination acid gas, High Efficiency Particulate Absolute (HEPA) filter cartridge will be worn as directed by the SHSO.
- Elemental phosphorus fires or P_2O_5 fumes encountered during sediment- or soil-intrusive work will be controlled by saturating the area with water, then covering the surface area with slag and/or soil, whichever is more appropriate at the time.

Section 5

PERSONAL PROTECTIVE EQUIPMENT

5.1 Levels of Protection

Levels D and C personal protective equipment (PPE) will be the predominant levels required for use during closure activities at the Phase IV Ponds. When any sediment- or soil-intrusive work is done, aluminized two-piece Gantex suits (silver suits) will be worn (in addition to the Level D or C PPE listed below) by all personnel in the exclusion zone. Silver suits must be worn with hard hats equipped with face shields and all-leather gauntlet gloves and all-leather or rubber steel-toed boots. Leather gauntlet gloves will be loose fitting to allow "throwing" the glove off in an emergency. Disposable respirators cannot be used at the FMC facility. At the FMC facility, all personnel must be clean-shaven and use an air purifying respirator as specified in the FMC Respirator Policy as shown in Attachment A-1.

Levels of protection are listed in the following subsections.

5.1.1 Level D PPE

Level D PPE required for personnel will include:

- Gantex suit as required.
- Tyvek coveralls (uncoated for dry work, or polycoated for wet work).
- Long leather gauntlet outer gloves.
- Latex inner gloves.
- Leather or rubber steel-toed boots.
- Hard hats.
- Hearing protection as required.
- Safety glasses with side shields or chemical splash goggles.
- Splash shield (for suspected or known elemental phosphorus areas).
- Long-sleeved shirt (under the prescribed PPE).
- Full-length pants (under the prescribed PPE).

5.1.2 Level C PPE

Required Level C PPE will include:

- Gantex suit as required.
- NIOSH/MSHA-approved full face or half face air-purifying respirators equipped with acid gas and HEPA combination cartridges
- Tyvek coveralls (uncoated for dry work, polycoated for wet work).
- Long leather gauntlet outer gloves.
- Latex inner gloves.
- Leather or rubber steel-toed boots.
- Hard hats.
- Hearing protection as required.
- Safety glasses with side shields or chemical splash goggles.
- Splash shield (for suspected or known elemental phosphorus areas).
- Long-sleeved shirt (under the prescribed PPE).
- Full-length pants (under the prescribed PPE).

5.1.3 Phosphorus Minimum Mandatory Standards (PPE)

Phosphorus minimum mandatory standards (Pocatello Ref. 2.5.1) for PPE are as follows:

- Standard aluminized short coat and pants (or aluminized bib overalls and coat).
- Safety hard hat (hood optional).
- Polycarbonate full-face shield (hood optional).
- Safety glasses.
- Loose fitting gauntlet-type gloves. They should be loose fitting so they can be slung off. No short, wrist-length gloves permitted.
- Rubber or leather steel-toed boots extending above the ankle. The objective is to prevent phosphorus from entering the boot.

PPE can reduce the possibility of contact with hazardous materials, but should also be used in conjunction with proper site entry protocol and other safety

considerations. The use of PPE can create other significant health hazards such as heat stress, reduction in physical movement, psychological stress, vision impairment, and communication and hearing difficulties. Overprotection as well as underprotection can be hazardous and should be avoided.

In general, Level D protection will be worn unless site conditions indicate an increase in the expected contaminant levels. FMC will provide all required PPE for its personnel. Contact lenses are not to be allowed in work areas. Splash shields shall be used when there is a potential for encountering elemental phosphorus or for contaminant splash hazards.

No changes to the specified levels of protection will be made without the approval of the SHSO.

Section 6

SAFETY EQUIPMENT

The SHSO will have the following items available for immediate use and all items will be located in the Exclusion Zone or CRZ personnel decontamination pad.

- 10-unit first aid kit (minimum).
- Supply of clean potable water.
- Disposable trash bags for non-hazardous waste.
- Waterless hand cleaner towelettes.
- Paper towels.
- Boot wash tubs (x3).
- Brushes with stiff bristles (x2).
- Nonphosphate containing detergent for wash tubs.
- Fire extinguisher (ABC Dry Chemical, 10 lb).
- Standby emergency water system charged and usable (a pressurized water hose).
- Safety tub water trough (for immersion of personnel).
- Kiddie pool (for spraying/decontaminating personnel leaving EZ).
- Portable eyewash (capable of delivering a continuous dual stream of water for 15 minutes).
- FMC portable radio (set to same channel as FMC Emergency Services and Guards).
- 55-gallon drums for disposing of contaminated wastes (such as PPE, etc.).
- Sanitary rest room facilities.

Section 7

WORK ZONES

Work zones will be established at each pond area to minimize the possibility of worker exposure to hazardous contaminants and to control the dispersal of contaminants to adjacent "clean areas" as per 29 CFR 1910.120. The exact boundaries of the work zones will be determined by the SHSO upon mobilization at the site. The closure activities will be conducted within the following three zones: Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Support Zone. The use of the "buddy system" will be employed for all personnel entering the CRZ and EZ.

Figure A-3 indicates the proposed layouts of the EZ, CRZ, and Support Zone for the Phase IV Ponds closure work.

7.1 Exclusion Zone

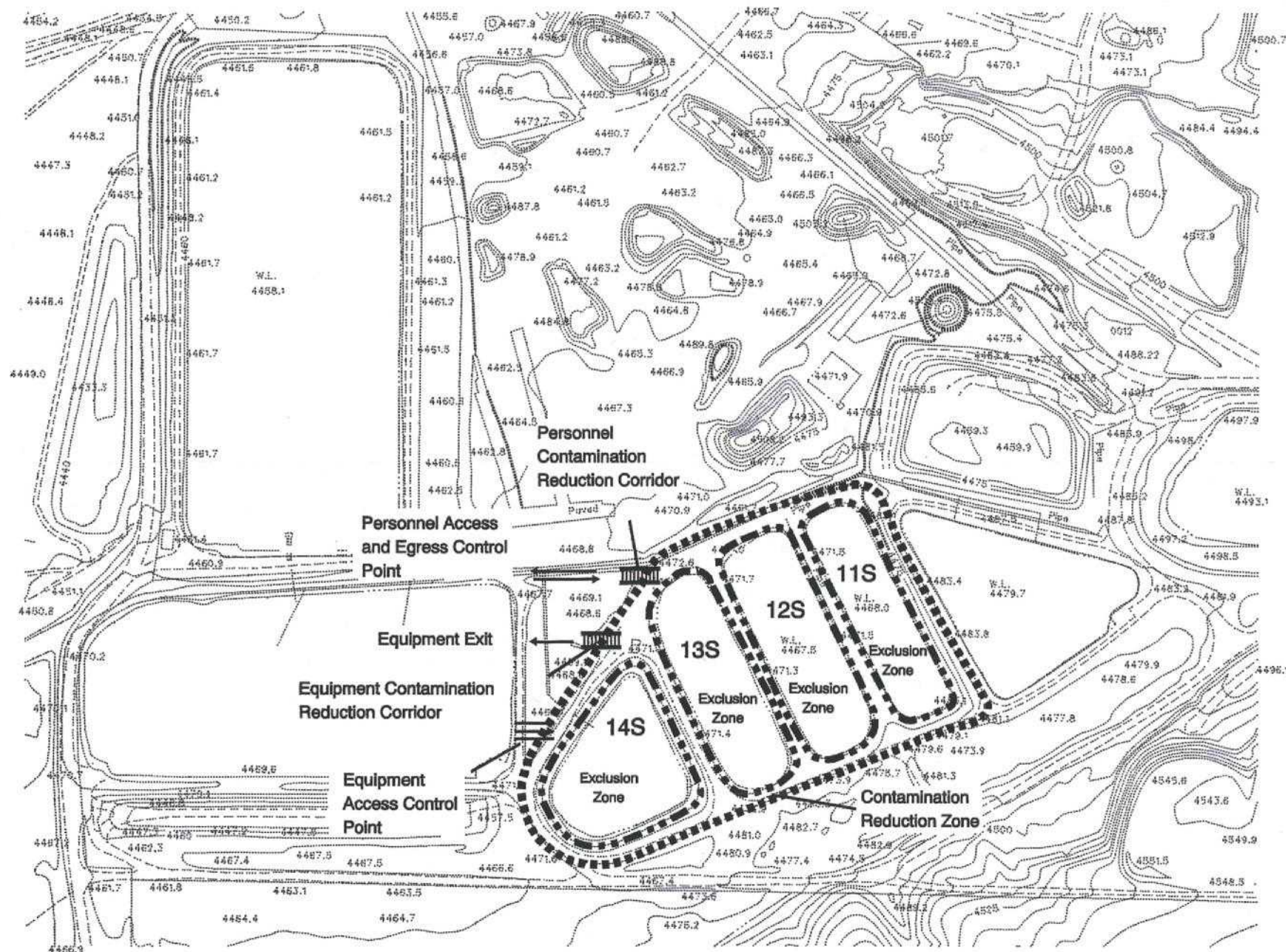
The EZ is the area where contaminated material is handled. The outer boundary of the EZ is called the HOTLINE. This boundary separates the EZ from the CRZ and will be clearly marked by visible yellow barricade tape (i.e., CAUTION DO NOT ENTER), visible lines, placards or signs, or enclosed by physical barriers such as chains, ropes, or fences. Access control points are established at selected locations at the periphery of the EZ to regulate the flow of personnel and equipment into and out of the EZ and to help make sure that the proper procedures for entering and exiting are followed. If feasible, separate entrances and exits should be established to separate personnel and equipment into and out of the EZ.

The EZ can be subdivided into different areas of contamination, based on the known or expected type and degree of hazard or on the incompatibility of contaminants. This allows more flexibility in health and safety requirements, operations, decontamination procedures, and use of resources. In some cases, the EZ will be intermittent while activities are being performed and reclassified as a CRZ or a Support Zone after the completion of the work activities.

7.2 Contamination Reduction Zone

The CRZ is to provide an area to prevent or reduce the transfer of contaminants which may have been picked up by personnel or equipment in the EZ. All personnel and equipment decontamination activities (i.e., decontamination pads) will take place in the CRZ.

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Legend

- Hotline
- Contamination Control Line



A-21

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

FMC CORPORATION
POCATELLO, IDAHO

Phase IV Ponds
Layout

Job Number	Drawing No.	Rev.
20906	FIGURE A-3	0

The boundary between the Support Zone and the CRZ is the Contamination Control Line. This boundary separates the possibly contaminated areas from the clean zone. Entry into the CRZ from the clean zone is through an access control point.

At the boundary between the CRZ and EZ is the HOTLINE and an access control station. Entrance into the EZ requires wearing prescribed personal protective equipment which, as outlined previously, is different than the equipment required for working in the CRZ or Support Zone. A personnel and an equipment decontamination station will be established adjacent to the HOTLINE. Any potentially contaminated clothing must remain in the CRZ until decontaminated.

7.3 Support Zone

The Support Zone (clean zone) will include areas not defined as CRZ, EZ, or general work zones. Job site administrative services, bulk supply storage, lay down area, and vehicle parking will be located in this zone.

Support Zone personnel are responsible for alerting proper authority in the event of an emergency. All telephone numbers, evacuation route maps, communications equipment, and vehicle keys should be kept in the Support Zone.

7.4 Work Zone Summary

All of the Phase IV Ponds closure activities will be conducted within the EZ and CRZ utilizing the "buddy system" (i.e., no less than two persons at all times in the EZ or CRZ).

The Phase IV Ponds EZ must be large enough to allow room to maneuver the heavy equipment and decontamination operations, without restricting personnel movement in the EZ. A HOTLINE barricade tape will be placed around the EZ (using traffic cones or T-posts to secure the tape and outline the EZ). A CRZ Contamination Control Line barricade tape will be placed around the EZ HOTLINE a minimum of 3 feet away, and will include the personnel and equipment decontamination pads/access control points to and from the EZ via the CRZ. The decontamination of personnel, PPE, and all equipment occurs in the various decontamination pads which will be set up. Also, the fire watch equipment, kiddie pool, and water trough (filled to the top with water) will be strategically located within the EZ to deal with direct contact with elemental phosphorus.

Figure A-3 is only a single graphical representation of the Phase IV Ponds layout. It should be noted however, that as site conditions allow and work activities dictate, the proposed layouts may be changed as determined necessary by the SHSO.

Section 8

DECONTAMINATION PROCEDURES

The decontamination process is used to control the spread of hazardous materials from the EZ through the CRZ to the Support Zone. Decontamination of items in the following categories will be required: vehicles, tools and field equipment (including sampling equipment); PPE and apparel; and personnel. A decontamination station for each pond area will be established adjacent to the EZ.

The SHSO will ensure that the following procedures are implemented at each site:

- All workers will follow appropriate decontamination procedures in accordance with this Closure Plan.
- The SHSO will ensure availability of decontamination equipment (i.e., detergent, rinse solution, wash tubs, brushes, paper towels, and plastic bags) at the station.
- Spray contact with surrounding soils will be prevented by use of plastic curtains to segregate the decontamination area from the support zone.
- Chemical splash protective goggles/face shields will be worn during all structure spray and wash for decontamination.
- All large equipment entering the EZ will remain in that zone until no longer needed. Once the equipment is released, it will be decontaminated at the designated decontamination station prior to leaving the site.
- Mobile equipment will be decontaminated by a combination of pressure wash and steam cleaning, using stiff brushes and detergent, as necessary, followed by a triple rinse.
- After exiting the EZ, personnel decontamination will proceed in the sequence described below:
 1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths. During hot weather operations, a cool-down station may be set up within this area.
 2. Drop leather gloves. Remove hard hat. Scrub outer gloves and rubber boots (or boot covers) with decontamination solution or detergent and water. Rinse copiously with uncontaminated water. Waste decontamination water will be disposed of in Pond 16S.
 3. Remove outer boots and gloves. Deposit in container.

4. Remove tape from wrists and ankles.
 5. Remove boots.
 6. Remove and discard Tyvek Suit.
 7. Remove respirator, wash, rinse, hang to dry (if worn). Avoid touching face with fingers while removing.
 8. Remove hearing protection. Deposit in container.
 9. Remove inner gloves. Deposit in container if disposable.
 10. Thoroughly wash hands, face, and neck.
 11. Proceed into Support Zone through appropriate checkpoint.
- After decontamination procedures are completed, workers will thoroughly wash their hands and all exposed skin surfaces before taking a break, eating, smoking, or using the toilet facilities.
 - After daily field work is completed, outer protective clothing and respirator cartridges will be removed as required. Respirators will be thoroughly washed, sanitized and properly stored for next-day use. Cartridges will be replaced on a biweekly basis or whenever breakthrough occurs.
 - Disposable PPE gear will be accumulated in containers and transported to an on-site landfill.
 - All run-off water and any sludge will be contained and containerized; decontamination rinseate and sludge will be disposed of in accordance with this Closure Plan.

Section 9

GENERAL SAFE WORK PRACTICES

The following safe work practices will be enforced during pond closure activities:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in any area.
- No smoking will be permitted except at specifically designated areas at the FMC site.
- Practice good personal hygiene such as washing hands and face.
- Portable emergency eyewash stations capable of delivering a constant dual stream for a minimum of 15 minutes will be located at all work stations.
- All wastes generated from the project activities (soiled PPE, decontamination waste, etc.) will be contained and disposed of as directed by the SHSO.
- Personnel on site must use the "buddy system" when working in confined spaces and in the Exclusion Zone. Communication between members must be maintained at all times.
- Facial hair on personnel which interferes with a satisfactory fit of respiratory protective equipment will not be allowed.
- All personnel on site are to be thoroughly briefed on the anticipated hazards, equipment requirements, safety practices, emergency procedures, and communication methods.
- Contact with potentially contaminated substances will be avoided (i.e., puddles, mud). Kneeling on the ground or sitting on the equipment and placing work equipment or tools on contaminated surfaces will be avoided.

Section 10

TRAINING AND MEDICAL SURVEILLANCE

All workers and visitors required for the proposed work activities will be required to satisfy OSHA requirements for HAZWOPER and Medical Surveillance as per 29 CFR 1910.120. Prior to commencement of work, all personnel will submit to the SHSO a copy of their current HAZWOPER training, current respirator fit-test (within the last year) and medical qualification certificates (respiratory qualifications/pulmonary function test, annual physical, hearing tests, etc.).

10.1 Training

In addition to the basic health and safety training required in 29 CFR 1910.120, site-specific training/orientation for project personnel will be required. This training/orientation will consist of the following basic elements: FMC facility safety training, elemental phosphorus hazards, protection and control, standard hazardous waste site operations, health and safety hazards and a site-specific orientation. On-Site Tool Box Safety Meetings will also be conducted daily before beginning any work shift or as frequently as needed by the SHSO or his/her designee to further assist personnel in conducting their activities safely. Tool Box Safety Meetings will be documented on the Tool Box Safety Meeting report form provided in Figure A-4.

10.2 Medical Surveillance

The FMC Pocatello facility is a hazardous waste TSD (treatment, storage, and disposal) facility. Therefore, medical surveillance programs are currently in place for all workers. These programs include respiratory qualification; baseline, periodic, and termination exams; and special programs as required. It is not anticipated that any additional programs will be needed for FMC employees.

I certify that the attached "safety speaking" material was read and explained to the personnel whose signatures are the back of this form.

Craft: _____ Foreman: _____ Date: _____

Where meeting held: _____ Time meeting held: _____

Names and craft numbers of personnel absent: _____

Topics discussed: _____

Safety questions and/or recommendations developed during meeting: _____

General foreman's signature _____ Date _____

Action taken on above suggestions or questions: _____

Superintendent's signature _____ Date _____

Action taken on above suggestions or questions: _____

All personnel attending this meeting must sign the back of this report.

Route the report in the following order:

1. General foreman

2. Craft superintendent

3. Safety department

Figure A-4 Tool Box Safety Meeting Report

Section 11

CONTINGENCY PLAN

In the event that conditions require an emergency response to an on-site fire or natural disaster, all field personnel will be familiar with and follow the procedures described below.

11.1 Emergency Services

The SHSO will ensure that methods and devices used to communicate with the security staff, the local police, fire and ambulance services, and hospital facilities are known to all project personnel. All personnel will be provided with clear and concise directions and accessible personnel transportation to local emergency services. A map highlighting the emergency route to the designated emergency facility will be posted in the Support Zone (Figure A-5).

11.2 Project Contacts

A list of emergency telephone numbers for key personnel will be included as shown below:

Task Manager: Name: TBD (To Be Determined)

Home phone:

Work phone:

SHSO: Name: TBD

Home phone:

Work phone:

SHSO Alternate: Name: TBD

Home phone:

Work phone:

FMC Contact: Name: TBD

Home phone:

Work phone:

FMC Radio Frequency: Channel 2

FMC Security for medical, fire, or emergency contact

On-site phone: 55

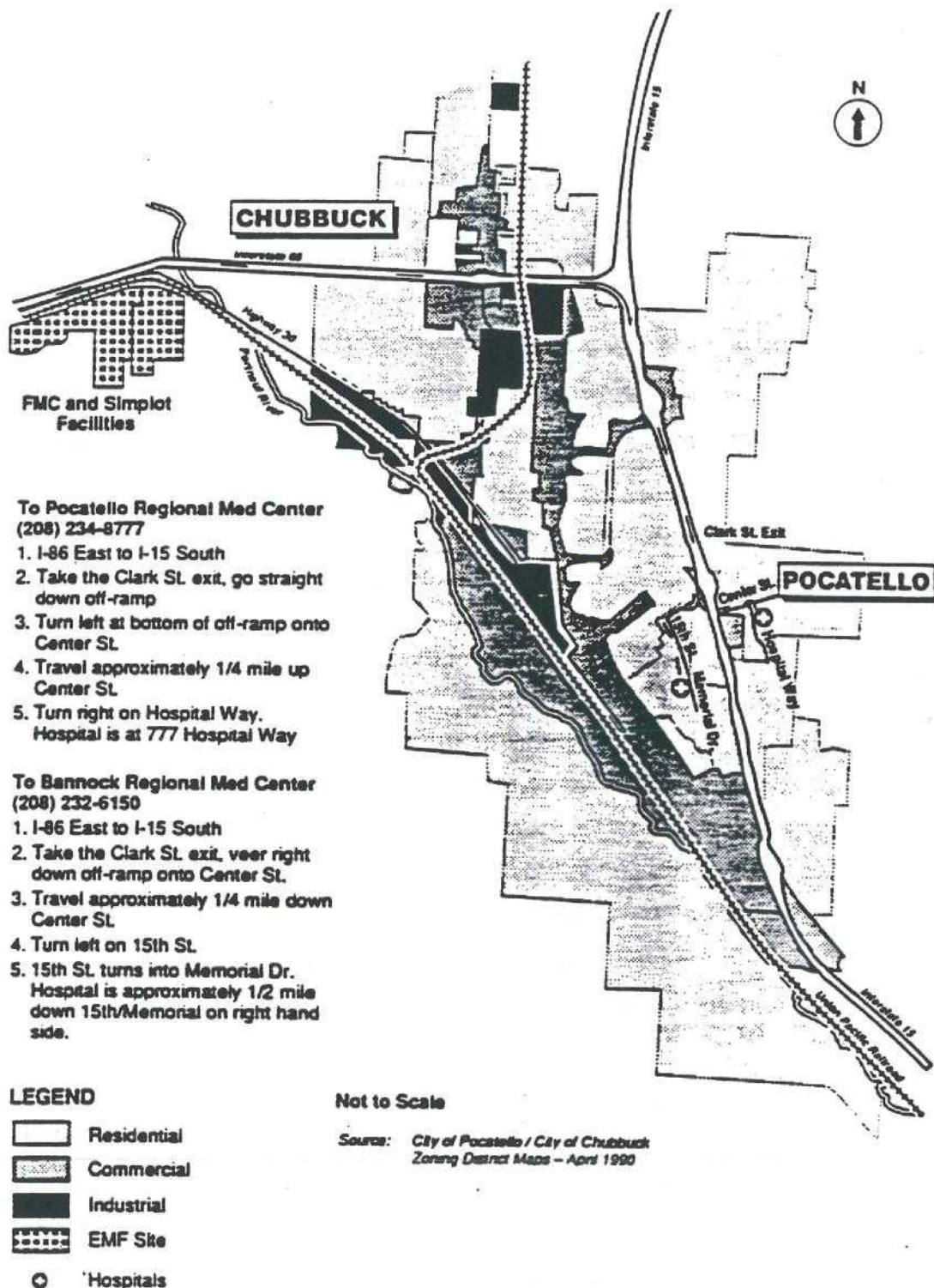


Figure A-5 Route to Hospitals

11.3 Emergency Evacuation from Contaminated Areas

Personnel requiring medical attention will be evacuated promptly from any hazardous or contaminated area. The SHSO will be responsible for evacuating any person from any area of property. Special decontamination treatment and/or procedures will be provided for any injured person.

Only qualified personnel will give first aid and stabilize any employee needing assistance. Professional medical assistance will be obtained immediately should life-threatening problems arise. FMC will provide and maintain a first-aid kit and portable pressurized eyewash facility as discussed previously at the work location. The evacuation procedures that are to be followed are those developed by FMC for their plant. Specific details for the emergency procedures are included in the Eastern Michaud Flats (EMF) Remedial Investigation/Feasibility Study (RI/FS) H&S Plan.

11.4 Emergency Actions

If any emergency involving actual or suspected personal injury occurs, the SHSO or designated person will follow these steps:

- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given.
- Obtain emergency paramedic services or ambulance transport to local hospital by calling 911 for emergencies that occur outside the FMC site. For emergencies occurring in the FMC facility, determine the incident level by contacting Plant Security Officer through the FMC 2-way radio network (Channel 2) or by calling 55 on the plant telephone to determine the incident level. Details of the procedures to be followed are identified in the FMC Incident Response Plan (refer to the EMF RI/FS H&S Plan).
- Evacuate other personnel on the property to a safe distance until the SHSO determines that it is safe to resume work.
- At the earliest practical time, contact the FMC Safety Department and FMC Project Managers to give them details of the incident and steps that have been taken to prevent its recurrence.
- Provide a written report of the incident to the FMC Safety Department and FMC Project Managers within 24 hours following the incident. Fill out an FMC Incident Report Form for incidents/accidents involving employees.

APPENDIX A ATTACHMENTS

Appendix A Attachments

The following FMC procedures are attached:

- FMC Respirator Policy (Attachment A-1)
- General Safety Rules for Contractor Employees (Attachment A-2)
 - Contractor Safety Requirements Booklet
 - FMC Special Conditions
- Contractor Safety Manual (Attachment A-3)
 - 2.1.1 Plant Safety Rules (General)
 - 2.1.3 Protective Measures for Wall, Floor, Roof, or Ground
Openings, Roof Perimeters and Elevated Work Platforms
 - 2.1.6 Barricades
 - 2.1.7 Safe Use of Scaffolding
 - 2.1.8 Safe Use of Portable Ladders
 - 2.1.8.1 Portable Metal Ladders
 - 2.2.11 Horizontal and Bench Grinders
 - 2.3.1 Color Code and Signs for Marking Hazards
 - 2.4.12 Inspection of Personal Safety Harnesses
 - 2.4.2 Inspecting Powered Hand Tools
 - 2.5.1 Phosphorus Mandatory Safety Standards
 - 2.7.2 Contractor Safety Guidelines
 - 2.9.1 Asbestos Policy and Procedures
 - 6.1 Reporting Work Connected Injuries
 - 6.2 Injury Notification and Follow-up
 - 6.4 Phosphorus Poisoning and Burns Hazards, Toxicity, First Aid
and Medical Treatment

FMC Respirator Policy

ATTACHMENT A-1

FMC
POCATELLO
SAFETY MANUAL

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FMC RESPIRATOR POLICY

THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REQUIRES THAT ENGINEERING CONTROLS BE APPLIED, WHEN POSSIBLE, TO REDUCE OR ELIMINATE EXPOSURE TO HARMFUL DUSTS, FOGS, FUMES, MISTS, GASES, SMOKES, SPRAYS, OR VAPORS. THE PRIMARY OBJECTIVE OF RESPIRATOR USE IS TO LIMIT EXPOSURE WHEN ENGINEERING CONTROLS ARE NOT FEASIBLE.

FMC RESPONSIBILITIES:

1. FMC WILL PROVIDE RESPIRATORS TO ITS EMPLOYEES AT NO COST.
2. THE RESPIRATORS AND CARTRIDGES WILL BE SUITABLE FOR THE INTENDED PURPOSE AS DETERMINED BY THE INDUSTRIAL HYGIENIST.
3. EMPLOYEES WILL BE TRAINED IN THE USE, MAINTENANCE, AND LIMITATIONS OF THE RESPIRATORS. A LIST OF TRAINED EMPLOYEES WILL BE SUPPLIED TO MANAGEMENT. A PERMANENT RECORD OF TRAINING WILL BE KEPT IN THE SAFETY DEPARTMENT
4. NO EMPLOYEE WILL BE ASSIGNED TO A TASK WHICH REQUIRES A RESPIRATOR UNTIL THAT EMPLOYEE HAS BEEN PROPERLY TRAINED. EMPLOYEES WILL BE FIT TESTED BY THE INDUSTRIAL HYGIENIST TO ENSURE PROPER RESPIRATOR SIZE AND EFFICIENCY.
5. A LIST OF APPROVED RESPIRATORS AND THEIR USE IN SPECIFIC ENVIRONMENTS WILL BE PROVIDED TO PURCHASING, MANAGEMENT, AND EMPLOYEES.
6. THE MANAGEMENT AT FMC POCATELLO IS RESPONSIBLE FOR ENFORCING THIS RESPIRATOR POLICY.
 - A. THE WORK AREA CONDITIONS AND THE DEGREE OF EMPLOYEE EXPOSURE TO HARMFUL AGENTS WILL BE EVALUATED BY THE SAFETY DEPARTMENT AND PLANT MANAGEMENT.
 1. ALL AREAS OF THE PLANT WITH POTENTIAL HARMFUL EXPOSURES WILL BE IDENTIFIED THROUGH AIR SAMPLING. PERMANENT RECORDS OF SAMPLING RESULTS WILL BE KEPT IN THE SAFETY DEPARTMENT.
 2. ALL SAMPLING RESULTS WILL BE COMMUNICATED TO AFFECTED EMPLOYEES.

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FMC RESPIRATOR POLICY

- B. ALL EMPLOYEES WHO ARE REQUIRED TO WEAR A RESPIRATOR DURING THEIR WORK WILL BE EXAMINED BY THE PLANT NURSE, THROUGH STANDING ORDERS FROM THE PHYSICIAN, TO DETERMINE IF THEY ARE ABLE TO USE A RESPIRATOR.
1. PULMONARY FUNCTION EXAMS WILL BE GIVEN IN PLANT TO DETERMINE LUNG CAPACITY.
 2. RECORDS OF ALL EXAMINATIONS WILL BE PERMANENTLY FILED IN THE EMPLOYEES MEDICAL RECORDS.
 3. A LIST OF ALL EMPLOYEES WHO HAVE BEEN TESTED AND ARE QUALIFIED TO WEAR A RESPIRATOR WILL BE GIVEN TO PLANT MANAGEMENT AND A PERMANENT LIST WILL BE KEPT IN THE SAFETY DEPARTMENT.
- C. RESPIRATORS SHALL BE REGULARLY CLEANED AND MAINTAINED.
1. EACH RESPIRATOR WILL BE TURNED INTO SECURITY AFTER 40 HOURS OF USE, OR BEFORE, IF IT IS DETERMINED THE RESPIRATOR NEEDS MAINTENANCE AND CLEANING.
 2. EACH RESPIRATOR WILL HAVE THE EMPLOYEES CLOCK NUMBER ON THE NOSE OF THE RESPIRATOR INSCRIBED WITH A PERMANENT MARKING PEN.
 3. THE EMPLOYEE WILL BE ISSUED AN EQUAL RESPIRATOR MARKED WITH HIS/HER CLOCK NUMBER.
 4. EACH EMPLOYEE WILL BE RESPONSIBLE FOR HIS/HER RESPIRATOR.
 5. THE SECURITY GUARD WILL CHECK THE RESPIRATOR FOR VALVE DEFECTS, SEAL IRREGULARITIES, STRAP WEAR, AND IN THE CASE OF SCBA AN IN-LINE BREATHING RESPIRATORS, FACE SHIELDS AND AIR HOSE WEAR.
 6. IF THE BODY OF THE RESPIRATOR AROUND THE SEAL IS DISTORTED OR TORN, OR IF THE BODY OF THE RESPIRATOR IS IN ANY WAY SUSPECTED TO BE DEFECTIVE, IT WILL BE DESTROYED AND REPLACED.

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FMC RESPIRATOR POLICY

7. A SUPPLY OF VALVES, VALVE COVERS, AND STRAPS WILL BE KEPT IN SECURITY.

CLEANING:

1. AFTER CARTRIDGES AND STRAPS HAVE BEEN REMOVED, THE RESPIRATORS WILL BE PLACED IN A DISHWASHER WITH MILD DISINFECTANT SOAP AND WASHED AND DRIED.
 2. AFTER THE RESPIRATOR HAS BEEN CLEANED, IT WILL BE ASSEMBLED AND PLACED IN A PLASTIC BAG WITH A LABEL DESCRIBING DATE OF MAINTENANCE AND CLEANING.
 3. A LOG SHALL BE KEPT TO INDICATE EMPLOYEE, DATE CLEANED, AND WHEN RETURNED.
 4. EACH EMPLOYEE SHALL ONLY WEAR HIS/HER ASSIGNED RESPIRATOR UNLESS THEY HAVE TO USE AN IN-LINE BREATHING RESPIRATOR IN THE FURNACE OR A SCBA DURING AN EMERGENCY. IN WHICH CASE, THE EMPLOYEE WILL TURN IN THE RESPIRATOR TO SECURITY, IMMEDIATELY AFTER USE, FOR CLEANING AND MAINTENANCE.
 5. ALL RESPIRATORS WILL BE STORED BY THE EMPLOYEE, IN THE PLASTIC BAG PROVIDED BY SECURITY.
- D. IN THE POCATELLO PLANT THERE WILL BE THREE TYPES OF SUPPLIED AIR RESPIRATORS.
1. CYLINDERS OF COMPRESSED AIR USED IN THE FURNACE PANEL BOARDS. THESE BREATHING CONTAINERS WILL BE MARKED IN COMPLIANCE WITH INST. 248.1-1954.
 2. AN OIL-LESS COMPRESSOR CALLED A HYTOR SUPPLIES IN-LINE BREATHING AIR FOR THE FURNACE. THE AIR INTAKE FOR THE HYTOR IS LOCATED UPWIND OF THE PLANT. A ROUTINE MAINTENANCE SCHEDULE IS FOLLOWED TO ASSURE THAT THIS SYSTEM IS FUNCTIONING AT ALL TIMES. P.M. RECORDS ARE PERMANENTLY KEPT IN THE MAINTENANCE WITH COPIES IN THE SAFETY DEPARTMENT A DELMONOX FILTERING SYSTEM IS USED TO BACKUP THE HYTOR SYSTEM. THE FILTERING SYSTEM IS ON A REGULARLY SCHEDULED MAINTENANCE PROGRAM AND P.M. RECORDS ARE KEPT IN MAINTENANCE AND IN THE SAFETY DEPARTMENT IT IS USED WITH AN OIL LUBRICATED COMPRESSOR WHICH SHALL HAVE A HIGH TEMPERATURE AND CARBON MONOXIDE ALARM, AS REQUIRED BY OSHA.

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FMC RESPIRATOR POLICY

3. DUSTFOE MSA RESPIRATOR.
4. SURVIVE AIR SELF-CONTAINED BREATHING APPARATUS; THIS SYSTEM IS ONLY USED IN EMERGENCY RESPONSE BY THE FIRE BRIGADE AND EMT MEMBERS. THE RESPIRATORS ARE KEPT IN THE AMBULANCE AND THE EMERGENCY RESPONSE VAN.
- E. IN AREAS WHERE THE EMPLOYEE COULD BE OVERCOME BY A TOXIC OR OXYGEN DEFICIENT ATMOSPHERE, AT LEAST ONE ADDITIONAL PERSON WILL BE PRESENT FOR EMERGENCY RESPONSE.
 1. THE WORK GROUP WILL MEET BEFORE INITIATING AN UNUSUAL OR DANGEROUS OPERATION INVOLVING THE USE OF RESPIRATORS, TO DISCUSS THE HAZARDOUS WORK PERMIT, THE HAZARDS OF THE JOB, AND THE CORRECT SAFETY PROCEDURES.
 2. IN AREAS OF IMMEDIATE HAZARDS TO HEALTH, THE WORKERS WILL ALSO WEAR A SAFETY HARNESS TO ASSIST IF EMERGENCY RESCUE IS MADE NECESSARY.
 3. RANDOM INSPECTIONS BY THE UNIT MANAGER WILL BE CONDUCTED TO ASSURE CORRECT PROCEDURES ARE BEING FOLLOWED.
- F. RESPIRATOR TRAINING SHALL INCLUDE:
 1. PROPER SELECTION OF RESPIRATORS.
 2. PROPER SELECTION OF CARTRIDGES.
 3. PROPER MAINTENANCE OF RESPIRATORS.
 4. PROPER FIT.
 5. DEMONSTRATION OF PERSONAL FIT TEST REQUIRED AT EACH WEARING OF A RESPIRATOR.
 6. USES AND LIMITATIONS OF RESPIRATORS.
- G. EMPLOYEES ARE HELD RESPONSIBLE FOR:
 1. USING THE RESPIRATOR CORRECTLY.

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FMC RESPIRATOR POLICY

2. CHECKING THE RESPIRATOR FOR DEFECTS.
 3. RETURNING THE RESPIRATOR TO SECURITY FOR CLEANING AND MAINTENANCE IN 40 HOURS OR LESS AND OBTAINING A RESPIRATOR FROM SECURITY FOR THE NEXT DAY.
 4. USING THE RESPIRATOR WHEN IT IS REQUIRED.
 5. REPORTING PROBLEMS HE/SHE MAY BE HAVING WITH THE RESPIRATOR OR JOB TO HIS/HER UNIT MANAGER.
 6. HAVING THE PROPER RESPIRATOR WITH THEM AT ALL TIMES WHEN WORKING IN THE PLANT. ANY EMPLOYEE ENTERING THE PLANT SHOULD HAVE A RESPIRATOR CAPABLE OF REMOVING DUST WITH HIM/HER WHEN HE/SHE ENTERS THE PLANT. IN ADDITION, ANY EMPLOYEE WORKING IN THE FURNACE BUILDING SHOULD HAVE A RESPIRATOR WITH A COMBINATION CARTRIDGE (#100344/104044) WITH HIM/HER WHEN HE/SHE ENTERS THE FURNACE.
- H. BEARD POLICY: EVERY EMPLOYEE AND CONTRACTOR MUST BE ABLE TO WEAR AN APPROVED RESPIRATOR AND OBTAIN A DUST TIGHT SEAL AGAINST THE FACIAL SKIN AT ALL TIMES.
1. BEARDS SHALL NOT BE PERMITTED BY ANY EMPLOYEE OR CONTRACTOR AT THIS FACILITY. ALL EMPLOYEES AND CONTRACTORS WILL HAVE TO BE CLEAN SHAVEN.
 2. MUSTACHES MUST BE TRIMMED SO THEY DO NOT INTERFERE WITH THE SEAL OF THE RESPIRATOR.
 3. SIDEBURNS MUST BE TRIMMED SO THEY DO NOT INTERFERE WITH THE SEAL OF THE RESPIRATOR.
 4. CONTRACTORS OR VISITORS ENTERING THE PLANT FOR A TOTAL OF 8 HOURS OR LESS CAN MAINTAIN FACIAL HAIR.
- I. APPROVED RESPIRATOR LIST:
1. SURVIVE AIR MODEL 2200 SILICON HALF MASK RESPIRATOR W/SPEAKING DIAPHRAGM.
 2. SURVIVE AIR MODEL 2600 SILICON HALF MASK RESPIRATOR W/O SPEAKING DIAPHRAGM.
 3. MSA DUSTFOE FOR RESPIRABLE DUST.
 4. SUPPLIED AIR MASK.

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5. SURVIVE AIR SELF CONTAINED BREATHING RESPIRATOR (EMERGENCY USE - BRIGADE AND EMT).
6. IN ADDITION TO THIS LIST, OTHER RESPIRATORS MAY BE BROUGHT IN FOR USE ON A TEST BASIS. THIS TESTING WILL BE PERFORMED TO EVALUATE NEW TYPES AND STYLES OF RESPIRATORS FOR USE IN OUR PLANT, AND SHOULD BE FOR NO LONGER THAN 90 DAYS. IF A NEW RESPIRATOR IS ACCEPTED FOR ROUTINE PLANT USE, MODIFICATIONS WILL BE MADE TO THIS POLICY TO ADDRESS THE NEW RESPIRATOR.

J. APPROVED CARTRIDGES:

1. #109044 - HIGH EFFICIENCY CARTRIDGE (HEPA).
2. #104044 - DUSTS, FUMES, AND MISTS FILTER.
3. #100344/104044 - ACID, GAS, ORGANIC VAPOR AND DUST, MIST, FUME FILTER.

APPROVED PLANT RESPIRATOR LIST

THE FOLLOWING RESPIRATORS ARE CURRENTLY APPROVED BY THE PLANT FOR USE IN THE FMC-POCATELLO PLANT. RESPIRATORS ARE LISTED BY TYPE, WITH THE RECOMMENDED USE FOR EACH TYPE OF RESPIRATOR LISTED UNDER "PRIMARY USE", AND OTHER PLANT MATERIALS THAT THE RESPIRATOR MAY BE USED FOR LISTED UNDER "SECONDARY USE". ONLY CONTAMINANTS THAT ARE LIKELY TO BE ENCOUNTERED AT FMC ARE LISTED, AS THE RESPIRATOR MAY BE APPROVED FOR MANY DIFFERENT CONTAMINANTS.

<u>RESPIRATOR TYPE</u>	<u>PRIMARY USE</u>	<u>SECONDARY USE</u>
SURVIVE AIR (BLUE SILICONE) WITH SPECIFIED CART:		
#109044	RADIONUCLIDES ASBESTOS (ASB. REMOVAL TEAM)	DUSTS
#104044	DUSTS P205 SMOKE WELDING FUMES	-----

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FMC RESPIRATOR POLICY

RESPIRATOR TYPE

#100344/104044

PRIMARY USE

PHOS VAPOR
ORGANIC VAPORS
SULFUR DIOXIDE

SECONDARY USE

SPRAY PAINTING
DUSTS
P205

SUPPLIED AIR MASK

ANY ENVIRONMENT
WITH UNKNOWN
CONTAMINANT
LEVELS NOT
IMMEDIATELY
DANGEROUS TO
LIFE AND HEALTH

FMC General Safety Rules For Contractor Employees

ATTACHMENT A-2



**Phosphorus Chemicals Division
Pocatello, Idaho**

CONTRACTOR SAFETY REQUIREMENTS BOOKLET

Revised 4/20/93

**This booklet is issued by the
FMC-Pocatello Safety Department.**

**FMC Project and Business Managers
are responsible for enforcing the
enclosed safety requirements with
each Contractor.**

FMC-POCATELLO

CONTRACTOR SAFETY REQUIREMENTS BOOKLET

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CONTRACTOR SAFETY REQUIREMENTS

INTRODUCTION

This booklet identifies the safety requirements for all Contractors performing work at the FMC Corporation plant in Pocatello, Idaho. Prior to signing a contract and prior to starting the work, Contractors must comply with all FMC-Pocatello safety policies and goals, as well as applicable safety regulations from the Occupational Safety and Health Act (OSHA), the Resource Conservation and Recovery Act (RCRA), and those of any other appropriate regulatory agency.

An overview of these safety requirements is provided here. For additional information, Contractors should refer to the FMC-Pocatello safety manuals, government literature, and other reference materials listed throughout this booklet. Assistance is also available from various government agencies and personnel in the FMC-Pocatello Safety Department (also identified herein as "the Safety Department").

Contractors should also contact the FMC-Pocatello Purchasing Department to ensure that contract conditions regarding bonding and insuring are satisfied.

The following is a list of the major safety-related activities all Contractors are required to perform. Each of these activities will be covered in more detail later in this booklet.

FMC-Pocatello will be continuously evaluating the skills, quality, and job performance of the Contractors' employees. FMC-Pocatello requires these employees' skills, quality, and job performance to meet FMC standards.

CONTRACTOR SAFETY REQUIREMENTS

All Contractors, with five or more employees, working at FMC-Pocatello for more than eight hours of a 40-hour week are required to meet the following requirements.
(Requirements marked with a * must be complied with before the Contractor starts work.)

- I. Maintain current knowledge of all FMC-Pocatello and government safety regulations as they apply to a Contractor's specific work
- II. Adhere completely to all FMC-Pocatello and government safety regulations
- * III. Submit a Safety Plan for review and approval by the FMC-Pocatello Safety Department, along with an Industrial Hygiene Plan
- * IV. Submit a Substance Abuse Policy, along with procedures for implementation and administration of that policy, to the FMC-Pocatello Safety Department Manager or other designated representative
- * V. Ensure that all of their employees attend an FMC Safety Orientation class prior to starting work at the plant and again on an annual basis
- * VI. Train employees on safety subjects as required by FMC-Pocatello, OSHA, and other government agencies, if applicable. The Contractor shall evaluate and update the training program on an ongoing basis.
- VII. Conduct daily employee Safety Meetings (a minimum of five minutes of job-specific information)
- * VIII. Provide personal protective clothing and safety equipment as required. When applicable, Contractors must ensure equipment is certified and inspected.
- * IX. Assign Safety Observer(s) whenever five or more employees are working together
- X. Conduct required safety audits and prepare written audit reports
- XI. Maintain required safety records for all safety-related activities listed here
- * XII. File appropriate records (reports, proofs, certifications, and more) with FMC-Pocatello and/or government agencies

SPECIAL CONDITIONS EFFECTING CONTRACTOR SAFETY REQUIREMENTS

All Contractors working at FMC-Pocatello less than eight hours of a 40-hour week are required to comply with the following minimum safety requirements.

- A. Maintain current knowledge of all FMC-Pocatello and government safety regulations as they apply to a Contractor's specific work
- B. Adhere completely to all FMC-Pocatello and government safety regulations
- C. Submit a Safety Plan for review and approval by the FMC-Pocatello Safety Department, along with an Industrial Hygiene Plan
- D. Ensure that employees are free of substance abuse and be prepared to test employees for substance abuse, if requested
- E. Ensure that all of their employees attend a FMC Safety Orientation class prior to starting work at the plant and again on an annual basis
- F. Train employees on safety subjects as required by FMC-Pocatello, OSHA, and other government agencies, if applicable. The Contractor shall evaluate and update the training program on an ongoing basis.
- G. Conduct a safety evaluation meeting with an authorized representative of FMC-Pocatello to discuss tasks, area concerns, hazards, and safety equipment.
- H. Provide personal protective clothing and safety equipment as required. When applicable, Contractors must ensure equipment is certified and inspected.
- I. Assign a Safety Observer whenever five or more employees are working together
- J. Conduct a safety audit
- K. Maintain required safety records for all safety-related activities listed here
- L. Produce, on demand, all OSHA-required training records, equipment certifications and test results and substance abuse testing records (if applicable)

(For additional special conditions, Contractors should contact the Safety Department.)

***BY LAW AND CONTRACT, IT IS THE CONTRACTOR'S
RESPONSIBILITY TO COMPLY WITH ALL SAFETY REQUIREMENTS***

I. CURRENT KNOWLEDGE OF SAFETY REQUIREMENTS

- A. The Contractor must maintain current knowledge of
 - 1. FMC-Pocatello's safety policies and procedures,
 - 2. OSHA standards, rules, and regulations, as they apply to the actions and conduct of the Contractor's employees,
 - 3. RCRA regulations, and
 - 4. Any other applicable safety requirements from regulatory agencies.
- B. The Contractor will update its employees, on a regular basis, through safety orientations, safety meetings, and training classes.
- C. For an up-to-date listing of safety requirements, information sources, and assistance, see the "Sources of Information and Assistance" section of this booklet.

II. ADHERENCE TO SAFETY REGULATIONS

- A. All Contractors and their employees shall adhere to all FMC-Pocatello and government safety requirements, as they apply to the actions and conduct of Contractors' employees.
- B. Contractors are required to maintain a workplace that is free of recognized hazards which could cause death or physical harm.
- C. All Contractors' work sites will be audited by FMC-Pocatello personnel on a weekly basis to confirm Contractors' complete compliance with OSHA and FMC-Pocatello safety requirements.
- D. VIOLATIONS OF FMC-POCATELLO AND OSHA SAFETY REQUIREMENTS WILL NOT BE TOLERATED. FMC-POCATELLO WILL MAKE EVERY REASONABLE EFFORT TO HELP CONTRACTORS COMPLY WITH SAFETY REQUIREMENTS. HOWEVER, VIOLATIONS MAY CARRY PENALTIES, INCLUDING DISMISSAL.

III. SAFETY PLAN AND INDUSTRIAL HYGIENE PLAN

FMC-Pocatello requires Contractors to make a commitment to areas of safety which are not traditionally emphasized by Contractors. If Contractors have any questions regarding compliance, they should contact the Safety Department.

- A. Prior to the start of any contract work at FMC-Pocatello, the Contractor is required to provide the Safety Department with a copy of its Safety Plan and Industrial Hygiene Plan for review and approval
- B. The Contractor's Industrial Hygiene Plan will contain

1. An Industrial Hygiene Policy statement
2. Other applicable information (A sample outline of the minimum contents of an Industrial Hygiene Plan is available from the FMC-Pocatello Safety Department.)

C. The Contractor's Safety Plan will include

1. A Management Safety Policy statement which designates the Contractor's Safety Representative and lists the qualifications for the Safety Observer
2. A Substance Abuse Policy statement and Substance Abuse Plan (See the "Substance Abuse Policies and Procedures" section of this booklet)
3. A Lockout/Tagout Policy statement
4. A Confined Space Policy statement
5. A list of all training topics required by FMC-Pocatello and/or OSHA, along with proof of training for all of the Contractor's employees who will be working at the Pocatello plant. (See the "Employee Safety Training" section of this booklet and the "Training and Motivation" section of the FMC-Pocatello Safety Manual)
6. A Respirator Policy statement that includes a list of all employees who have been tested
7. A list of all employees tested for respirator fit and copies of the test records
8. A list of all employees who have received the OSHA 1910.134 Medical Examinations, partial pulmonary lung capacity tests which verify an employee's ability to wear a respirator. Copies of the examination records and a doctor's certificate shall also be provided to FMC-Pocatello.
9. An Equipment Inspection Policy statement
10. A list of safety inspections for all crane, manlift, rigging, and other equipment, per OSHA standards.
 - a. While working in the plant, these inspections must be submitted on a monthly basis to the Safety Department.

- D. Samples and/or detailed descriptions of the policies and plans listed above are available from the Safety Department.**

IV. SUBSTANCE ABUSE POLICIES AND PROCEDURES

A. FMC-Pocatello Substance Abuse Policy

1. FMC-Pocatello has a strong commitment to providing a safe and healthy workplace. Consistent with this commitment, the company has established a Substance Abuse Policy and Plan. In accordance with this plan, the Contractor is required to follow certain procedures as follows. (For a complete explanation of the Substance Abuse

Policy and Plan, see the volume "Contractor Safety Requirements: General Reference and Samples")

B. Contractor's Substance Abuse Policy

The Contractor shall submit a written Substance Abuse Policy, along with procedures for the implementation and administration of that policy, to the FMC-Pocatello Project Manager or a designated representative.

1. The Contractor's policy shall be in complete compliance with all federal, state, local, and plant safety and health regulations.
2. The Contractor must notify its employees of the content and requirements of its Substance Abuse Policy.
 - a. Contractor employees must read and sign a statement of the Substance Abuse Policy of FMC-Pocatello and the Contractor. A copy of these signed statements must be on file with the Contractor and the Safety Department prior to the employee starting work.
3. The Contractor's Substance Abuse Policy must contain, at a minimum, the following requirements:

C. Testing Procedures

1. Monitoring Testing

The Contractor is responsible for monitoring all substance abuse testing of its employees.

2. Conducting Testing

- a. Substance testing shall be conducted by a properly qualified and competent laboratory which follows the standards of and is certified/accredited by the National Institute on Drug Abuse (NIDA).
- b. All samples shall be collected, sealed, and transported according to the chain-of-custody protocol as defined by the NIDA.
- c. For minimum testing requirements, see the FMC-Pocatello Substance Abuse Plan.

3. Certification and Other Records

- a. All Contractor employees must be certified as "substance free" prior to starting work at any FMC-Pocatello site. A copy of this certification for each employee must be available upon request from the Contractor.
- b. Written confirmations of positive test results must be provided to the Safety Department.
- c. The Contractor is required to maintain all substance testing records related to FMC-Pocatello work for the life of the contract plus one year, or longer, if required by law.

- d. The Contractor shall allow FMC-Pocatello or its agents complete access to its substance abuse program and testing records as they pertain to the FMC-Pocatello contract work.
- e. Written verification of the testing laboratory's qualification must be provided to the Safety Department on an annual basis or on demand.
- f. All Substance Abuse Policy statements signed by employees must be placed on file with the Safety Department and maintained by the Contractor.

4. Preaccess Testing

- a. All contract employees assigned to the FMC-Pocatello plant must be tested and confirmed negative for substance abuse within thirty (30) days prior to starting work.
- b. The Contractor is required to provide certification of this testing and the results to the Safety Department.
- c. The Safety Department must be notified immediately of any positive test results.

5. Annual Testing

- a. The Contractor shall certify annually that all of its employees, who have been continuously assigned to an FMC-Pocatello site for a minimum of one year, have been tested negative for substance abuse within thirty (30) days of the employee's one year anniversary date of assignment to the FMC-Pocatello site.

6. "For Cause" Testing

- a. "For Cause" testing of any Contractor employee may be conducted without prior announcement when there is reasonable suspicion or cause. (See the FMC-Pocatello Substance Abuse Plan for a complete description of the types of testing procedures and other "for cause" conditions)

D. Denying Access

- 1. The Contractor shall not allow any employee with a positive substance abuse test access to a FMC-Pocatello site. (See Substance Abuse Plan for information regarding counseling/rehabilitation programs)

E. Enforcement

- 1. The Contractor is responsible for enforcing its Substance Abuse Policy.
- 2. Violation of any provisions of the Substance Abuse Policy of FMC-Pocatello is strictly prohibited. Violations will result in administrative action by FMC-Pocatello, up to and including termination of the Contractor's contract and removal and barring of the Contractor from FMC property.

- F. The Contractor shall review the FMC-Pocatello Substance Abuse Policy and Plan in full to ensure complete compliance with its requirements.

V. SAFETY ORIENTATION CLASSES

- A. The Contractor shall ensure that all employees attend a FMC-Pocatello Safety Orientation Class prior to starting work at the plant.
 - 1. The Contractor's employees shall also attend orientation meetings on an annual basis.
 - 2. The Contractor shall advise the FMC-Pocatello Safety Department of the orientation class schedule, so a department representative may attend on a random basis.
 - 3. Records of these orientation classes shall be submitted to the Safety Department.
- B. Safety Department personnel will provide the Contractor's management with FMC-Pocatello Safety Orientation Training.
 - 1. All Contractor supervisors will provide the FMC-Pocatello Safety Orientation and Training for the Contractor's hourly employees.
 - 2. All orientation and training records will be submitted to the Safety Department. These records must be signed by the Contractor's management.

VI. EMPLOYEE SAFETY TRAINING

***Employee safety training
is the responsibility of
the Contractor.***

- A. The Contractor shall train all employees on safety subjects as required by the safety requirements of FMC-Pocatello, OSHA, and any other applicable regulatory agency. The Contractor shall also provide its employees with safety training applicable to any work the employees are required to perform.
 - 1. A portion of this training will be presented as a Safety Orientation Class and must be held prior to a Contractor employee starting work and then annually. (See "Safety Orientation Classes" section)
- B. The Contractor shall evaluate and update its training program on an ongoing basis.
- C. The Contractor shall maintain records of employee safety training, subjects covered, and employees attending. These records will be submitted to the FMC-Pocatello Safety Department.
- D. The Contractor shall conduct job- or site-related safety meetings on a daily basis which will have safety training benefits. (See "Daily Employee Safety Meetings" section)
- E. The following is a partial list of subjects required by FMC-Pocatello, OSHA, and RCRA as a part of the minimal training program. There are more than 100 OSHA-required and job-specific subjects that must be covered in training sessions. Many of these subjects must be presented annually.

1. Recommended topics for monthly safety meetings include these OSHA-required subjects:

- Presentation On Asbestos. (How to identify, what to do when found)
- Fire Extinguishers And Related Materials
- Electrical Safety
- New OSHA Confined Space And Trenching
- Personal Protective Equipment (eye protection, respirators, hearing protection, etc.)
- Hearing Conservation and Respirators
- Lockout/Tagout Policy
- Hazard Communications
- Emergency Response (evacuation, fire, MERG, etc.)
- Medical And First Aid
- Blood Borne Pathogens
- Hazards Recognition and Communications
- Scaffolding (following OSHA rule)

2. Listed below are additional employee training topics for the Contractor's consideration. Several are OSHA-required subjects. If employees are performing work involving these topics, the Contractor is required to provide applicable safety training.

- Manlift Baskets
- Machine Guarding
- Compressed Gasses, Flammable and Combustible Gasses and Liquids, Explosives, Pressure Reliefs and Pressure Vessels
- Powered Industrial Trucks
- Cranes and Lift Rigs
- Rigging
- Welding, Cutting, Brazing
- Heat Stress
- P4 Minimum Standards
- Accident and variance investigations
- Barricades
- Equipment Inspection
- Industrial Hygiene (sampling and records)
- Radiation
- Ventilation
- Engineering Standards
- Housekeeping

VII. DAILY EMPLOYEE SAFETY MEETINGS

- A. The Contractor shall conduct job- or site-related employee safety meetings on a daily basis for a minimum of five minutes. Minutes of these meetings shall be provided to the Safety Department and FMC-Pocatello Project Manager.
- B. Minutes of these safety meetings will contain a brief but specific description of the safety subject(s) covered.

VIII. SAFETY EQUIPMENT AND PERSONAL PROTECTIVE CLOTHING

- A. The Contractor must provide its employees with personal protective clothing and safety equipment as required by the safety regulations of FMC-Pocatello, OSHA, and other regulatory agencies.
- B. When necessary, the Contractor must ensure that the equipment has been certified or inspected according to OSHA standards and provide copies of these records to the Safety Department.
- C. The personal protective clothing and safety equipment required by FMC-Pocatello includes the following. (All equipment must be used in accordance with government and FMC regulations.)
 - 1. Anyone working in or visiting the plant's Process Area must wear the following:

full-length pants	gloves*
hard hats	Respirator**
long-sleeve shirt	
safety glasses with side shields or goggles***	
leather, steel-toed, over-the-ankle safety shoes	

- 2. **Safety Harnesses:** When elevated five feet or higher, safety harnesses are required. All safety harnesses must have the proper lanyard and tie off. **No safety belts are allowed.**
- 3. Contractor employees are not allowed to wear clothing, jewelry or hairstyle that could get caught in equipment. The need for additional equipment (such as face shields, aluminized suits, hearing protection, etc.) will depend on the area visited, plant conditions and activity planned.
- 4. ***Gloves:** Cloth-backed, leather-palm gloves are permitted in areas where no phosphorus work is being performed. Long all-leather or neoprene gloves are required for work wherever phosphorous exposure is possible.
- 5. ****Respirators:** Respirators must be carried at all times. Contractor employees must make sure they have the appropriate respirator for their activities, even if those employees work in operational areas for less than eight hours of a 40-hour week.
 - a. As a minimum requirement, all Contractor employees must wear a FMC-approved, NIOSH half-mask respirator, with the correct cartridges.
 - b. The Contractor is required to provide written proof that all employees have been fitted for a respirator and that they have received the OSHA 1910.134 Medical Examinations, partial pulmonary lung capacity tests. The test and examination records must include a doctor's certification that the employee is able to wear a respirator. All of these test and examination records must be provided to the FMC-Pocatello Safety Department.

- c. The Contractor is required to provide employees with respirator training and provide the Safety Department with records of that training. (See the "Employee Safety Training" section)
 - d. The Contractor is required to implement a program for the cleaning and maintenance of respirators, according to OSHA standards.
 - e. **Hair, Beards, Mustaches, and Sideburns:** Employees are not permitted to work in an environment requiring a respirator unless a good seal can be obtained between the respirator and the facial skin. As a result, beards are not permitted, and mustaches and sideburns must be trimmed so as not to interfere with the respirator seal.
6. *****Safety Glasses:** All Contractor employees are required to wear safety glasses with side shields. Clear lens safety glasses must be worn while working in or passing through any FMC-Pocatello buildings and vehicles. Contractor employees are prohibited from wearing sunglasses inside any building at a FMC-Pocatello site.
- D. For additional information on safety equipment specifications and instructions for use, see the "Contractor Safety Requirements: General Reference and Samples" and/or "Contractor Safety Requirements: Training Data". Both information volumes are available from FMC-Pocatello Safety Department personnel.

IX. SAFETY OBSERVER

- A. The Contractor shall assign Safety Observer(s) for each of its FMC-Pocatello projects, when five or more workers are assigned to the project.
 - 1. One Safety Observer may be used for multiple jobs if approved by the FMC-Pocatello Safety Department and Project Manager.
- B. The purpose of the Safety Observer Program is to reduce incidents involving injuries, health problems, and near misses; eliminate unsafe acts and conditions; reinforce the use of procedures, standards and policies involving safety, operations, maintenance, and rehab.
- C. Duties of the Safety Observer will be auditing, problem solving, safety coordination, ensuring compliance of standards, testing, communications, investigating, and recordkeeping.
 - 1. Upon observing any employee action which endangers any employees (e.g., possible injuries or creation of hazardous condition), the Safety Observer shall complete a "STOP" form and forward a copy to the Safety Department. The "STOP" form includes
 - A description of the unsafe act,
 - A description of unsafe conditions,
 - A name or names of employees committing unsafe act,
 - A description of the corrective action taken,
 - The date of unsafe act or unsafe conditions, and
 - The name of foreman, supervisor, safety personnel, FMC-Pocatello employee, or Contractor employee completing report.

2. For a detailed list of Safety Observer duties, see "Safety Observer Program" sections in the volume "Contractor Safety Requirements: General Reference".
- D. The Safety Observer has the authority and responsibility to stop work at the site if a safe work environment does not exist.
- E. Qualifications for the Safety Observer position will be outlined in the Contractor's Safety Plan as part of the Management Safety Policy.
 1. All Safety Observers must have at least three years craft-specific experience relating to the contract work being observed.
 2. To qualify as a Safety Observer, an employee must attend a Safety Observer class. Personnel from the Safety Department will provide this training.
 3. For a complete description of Safety Observer Program, see the volume, "Contractor Safety Requirements: General Reference and Samples".

X. SAFETY AUDITS AND AUDIT REPORTS

- A. The Contractor is required to audit its work sites twice a week. Audits will be conducted by the Safety Observer and a member of the Contractor's management.
 1. Audits will cover such subjects as tasks, housekeeping, hazards, lock out/tag out, phosphorus minimum standards, preventative maintenance, personal protective equipment, temporary wiring, tools, mobile equipment, safety records, safety meetings, and other Contractor procedures.
- B. Following each audit, an audit report must be prepared and copies provided to the FMC-Pocatello Safety Department and Project Manager.
 1. For additional procedures, see the "Safety Audits" section of the volume "Contractor Safety Requirements: General Reference".
 2. For sample forms, contact the Safety Department.

XI. SAFETY RECORDS

- A. The Contractor shall maintain safety records as required by FMC-Pocatello, OSHA, and other applicable regulatory agencies.
- B. Safety records to be maintained by the Contractor include the following:

SAFETY RECORDS TO BE MAINTAINED BY CONTRACTOR

1. Employee safety training records
2. Employee safety orientation records
3. Safety audit reports
4. Minutes of daily employee safety meetings
5. Equipment inspections
6. Safety Plan
7. Industrial Hygiene Plan
8. Substance Abuse Plan and procedures

9. Safety Observer records
 10. Employee respirator fit test records and partial pulmonary lung capacity exam records. Employee respirator training records.
 11. "Safety Guidelines for Contractors" sheets signed by employees and supervisors after viewing orientation video.
 12. Employee substance abuse test records — preaccess, annual, and "for cause" tests
 13. Signed proof of employees reading the Substance Abuse Policy
 14. Substance abuse testing records
- C. When filing records, submit immediately upon availability to the Safety Department secretary.
- D. All Contractor safety records shall be available on demand.
- E. All original copies of Contractor records filed will be available at the Safety Department if needed by FMC personnel.

XII. FILING PAPERWORK

- A. The Contractor shall file certain safety records with FMC-Pocatello, OSHA, and other appropriate regulatory agencies. See "Safety Records" section for additional information.

XIII. OTHER CONDITIONS

A. ACCIDENT REPORTS

1. All Contractors must complete a FMC-Pocatello "Accident Investigation Form" for all injuries and variances (near misses).
2. The Accident Investigation Form should be submitted to the FMC Project Manager or Construction Manager.
3. All accident investigations must include the Contractor's Foreman, an FMC Supervisor, an FMC-Pocatello hourly safety representative, the injured party, and any witnesses. Any investigation of situations involving an OSHA-classified medical treatment must include a Safety Department representative.
4. See the "Contractor Safety Requirements: General Reference and Samples" volume for forms and detailed filing instructions.

B. SMOKING

1. Smoking is prohibited inside any FMC-Pocatello structure or vehicle.

XIV. SOURCES OF INFORMATION AND ASSISTANCE

A. Reference Material

1. Contractor Safety Requirements: General Reference and Samples binder
2. Contractor Safety Requirements: Training Data binder
3. FMC-Pocatello Safety Manual

B. Safety Personnel and Agencies

1. OSHA
2. FMC-Pocatello Safety Department

As an authorized representative of the Contractor, I acknowledge receipt of these FMC-Pocatello Contractor Safety Requirements and further acknowledge that it is the Contractor's responsibility, by law, to comply with all government safety regulations.

Authorized Representative

Contractor/Company

Date

NOTES

FMC CORPORATION

SPECIAL CONDITIONS

1. Insurance Requirements
2. TERO
3. Safety Requirements
4. Substance Abuse Policy Guidelines for Contractors

Insurance Requirements

- A. During the course of performance of services under this Agreement until final acceptance of the work CONTRACTOR shall maintain standard policies of liability insurance with coverages and minimum limits of liability as follows:

<u>Coverage</u>	<u>Minimum Limits of Liability</u>
I. Workmen's Compensation (including liability under Longshoremen and Harbor Workers Act, where applicable)	Statutory Limits
II. Employer's Liability	\$100,000 each occurrence
III. Contractor's Comprehensive General Liability (including Contractual Liability, Owner's and Contractor's Protective Liability and Broad Form Property Damage Endorsement)	\$1,500,000 each occurrence
IV. Completed Operations and Products Liability	\$1,500,000 each occurrence
V. Automobile Comprehensive Liability (including Hired Automobile and Non-Ownership Liability)	\$1,500,000 each occurrence
VI. Professional Liability	\$1,000,000 each occurrence
B. Before commencing the work, CONTRACTOR shall furnish FMC with certificates of insurance providing the above coverages, identifying the FMC project name and contract number, and providing for at least ten (10) days written notice prior to cancellation or material change, and certifying as follows:	
(a) Where applicable, that no XCU exclusions or other similar restrictive clauses are contained in the policies (such as those regarding excavating, driving of sheet piling, moving, shoring, underground damage, explosion, blasting, collapse, underpinning, removal and rebuilding structural supports and sub-surface work).	
(b) To the extent permitted by law, that underwriters right to subrogation against FMC is waived.	

- C. During the course of performance of services under this Agreement, FMC will obtain and pay for Fire and Extended Coverage and Difference in Conditions insurance covering FMC, the CONTRACTOR and Subcontractors' as their respective interests may appear on the buildings, structures, equipment and materials under construction, on the building site or whole in transit, which are to become a permanent part of the completed work. FMC and CONTRACTOR waive all rights against each other for damages caused by the perils covered by such insurance. Any insured loss will be settled with FMC and the proceeds shall be payable to FMC and the CONTRACTOR and the Subcontractors as their interests may appear. The foregoing insurance or risk assumption will not apply to property owned or rented by a CONTRACTOR or Subcontractors which is not intended to become a permanent part of the completed work. The insurance provided by FMC shall be the standard "All Risk" Builders Risk type but shall not cover losses caused by the perils of war, theft, gradual deterioration or depreciation, nuclear reaction or radiation, or for losses due to inherent vice or defective workmanship or materials. It shall remain effective until transfer of the work, whichever event shall first occur, provided, however, that upon acceptance of care custody and control of the work by FMC, the accepted portion shall be deemed to be existing property of FMC.
- D. FMC will also obtain and pay for Ocean Marine Cargo insurance protecting the respective interests of FMC, the CONTRACTOR and Subcontractors covering overseas movement by water, air and/or connecting conveyance of material and equipment, which is to become a permanent part of the completed work under this Agreement, while in transit to the job site, subject to the condition that FMC is informed ten (10) days prior to the commencement of shipment.
- E. Losses or expenses incurred by the CONTRACTOR not compensated by the insurance prescribed in "A" above, which are due to negligence or fault of the CONTRACTOR or Subcontractors, their agents or employees, shall not be deemed to be part of the performance and shall not be payable by FMC.
- F. CONTRACTOR undertakes to permit no Subcontractor to enter upon or continue performance unless such Subcontractor is and remains insured in accordance with the foregoing requirements. CONTRACTOR shall indemnify FMC for any loss suffered by it for the failure of any Subcontractor to be so insured.
- G. CONTRACTOR agrees that it and all of its Subcontractors comply with all applicable Workmen's Compensation laws and that it will from time to time, on the request of FMC, furnish evidence to FMC that all payments required by such laws have been and are being made.
- H. Certificates of insurance shall be identified on their faces as to project name and contract number and shall be mailed to the attention of:

Stephen C. Sutton
FMC Corporation
PO Box 4111
Pocatello, Idaho 83202

2. TERO

The Shoshone-Bannock Tribes have enacted a Tribal Employment Rights Ordinance (TERO). FMC is located within the exterior boundaries of the Shoshone-Bannock Indian Reservation. The United States Federal Court has determined that the Tribes can enforce TERO against FMC. Contractor should, therefore, be familiar with the provisions of TERO including, but not limited to, the sections requiring hiring preference for individual Indians and contracting preference for Indian-owned businesses. TERO states that it is binding on all CONTRACTORS and subcontractors of FMC and that it shall be deemed a part of all resulting specifications. Accordingly, CONTRACTOR shall defend, indemnify and hold FMC harmless from any claims or liability arising from Contractor's failure to comply with TERO.

3. Safety Requirements

- I. Prior to start of construction or maintenance work, CONTRACTOR shall provide the FMC Safety Department with a copy of its Safety Plan for review, which will include:
 - A. Lockout/Tagout policy.
 - B. Confined Space Policy.
 - C. A list of all OSHA related training topics and proof of training and content as required by FMC.
 - D. List of all respirator fit tested employees and recorded proof of tests.
 - E. A permanent type NIOSH approved respirator is required if CONTRACTOR employee will be working in the plant eight hours or more. CONTRACTOR employees shall have respirators in possession at all times within the plant and shall wear respirator in designated areas.
 - F. List of all employees who have had 1910.134 Medical Examinations partial pulmonary lung capacity test for respirator use to verify that the CONTRACT employee can wear a respirator. CONTRACTOR shall provide copies of these tests
 - G. List of all crane, manlift and rigging safety inspections per OSHA Standards. Note: Inspections to be submitted to FMC Safety on a monthly basis while working in plant.
 - H. Management Safety Policy Statement with designated Safety Representative
 - I. Industrial Hygiene Policy Statement.

- II. CONTRACTOR is required to assign a Safety Observer for each of its projects. Where CONTRACTOR is working on simultaneous FMC Projects, CONTRACTOR may be allowed to use one Safety Observer for multiple projects provided FMC Safety Department and the Project Manager make such an allowance and gives appropriate permission. This observer will monitor the safety conditions of the work site, have the authority and responsibility to shut down the job, and interface with FMC Safety and Project Manager. Qualifications for Safety Observer Position will be contained in CONTRACTOR'S Management Safety Policy Statement.
- III. CONTRACTOR employees are required to attend an FMC Safety Orientation class before being permitted to work in the plant. This class will be renewed on a yearly basis. FMC will train all CONTRACTOR supervisors, they will be required to sign a certificate of training, and will be given an FMC safety orientation training video tape to assist in training CONTRACTOR employees. CONTRACTOR employees are also required to sign the certification of training. The FMC Safety Department will be informed by the CONTRACTOR when all employee orientation classes will be held and an FMC representative will attend on a random basis.
- IV. All Safety orientation records are to be submitted to the FMC Safety Department.
- V. All CONTRACTOR work sites will be audited by FMC on a weekly basis to check for OSHA and FMC Safety compliance. VIOLATIONS OF OSHA AND FMC SAFETY REGULATIONS WILL NOT BE TOLERATED.
- VI. All CONTRACTOR safety observers, with a member of CONTRACTOR management, will be required to audit their work site twice a week. A copy of the audit report will be given to the FMC Project Manager and FMC Safety Department.
- VII. CONTRACTOR is required to hold a job or site related safety meeting with its employees on a daily basis. A copy of the content of the meeting will be provided to the FMC Project Manager and the FMC Safety Department.
- VIII. All chokers and slings must be certified for maximum load rating. Loads shall not exceed certified rating.
- IX. All CONTRACTOR employees shall have safety glasses meeting FMC requirements.

- X. Safety harnesses must be used as required by FMC Standards. Safety belts are not acceptable.
- XI. CONTRACTORS shall provide ground fault current interrupter (GFCI) for all portable 120 volt equipment. Minimum sized wire for extension cords is 14 gauge, three conductor cable.
- XII. Equipment powered by 480 volt, 3 phase must be wired with minimum #6 gauge extension cords and be equipped with Appleton 60 amp type plugs, 4 wire, 4 plugs or equal.
- XIII. FMC requires all personnel working at the plant to be clean shaven to assure passing respirator fit test. No beards are allowed.

3. Substance Abuse Policy Guidelines for Contractors

FMC has a strong commitment to its employees to provide a safe and healthy work place and to establish programs promoting high standards of employee health and safety. Consistent with the spirit and intent of this commitment, FMC has established this Special Condition of the contract regarding drug and alcohol abuse for its CONTRACTORS and subcontractors of any tier (CONTRACTOR) who performs work (services, deliveries, inspections, etc.). It is FMC's desire to continue the establishment and maintenance of a work environment that is free from the effects of drug and alcohol abuse.

I. MINIMUM REQUIREMENTS

FMC requires, and CONTRACTOR agrees, as a condition of acceptance, to adopt and enforce a written drug and alcohol abuse policy. CONTRACTOR's policy shall be consistent with and at a minimum, contain the following requirements:

1. CONTRACTOR agrees to notify its CONTRACT WORKERS of the contents and requirements of its policy. For purposes of these Guidelines, a CONTRACT WORKER is any employee, associate, agent, representative, (assignee) or successor in interest who performs work (services, deliveries, inspections, etc.) on FMC property or in the course of FMC related business.
2. CONTRACTOR's policy shall be in complete compliance with any and all federal, state and local governmental regulations and legal requirements in effect for the applicable FMC location.
3. The minimum requirements for CONTRACTOR's Substance Abuse Policy shall include, but need not be limited to, the following or similar provisions:
 - a. The use, abuse, presence in the body or reporting to work under the influence, bringing onto company property, unlawful manufacture, distribution, dispensation, possession, purchase, transfer, storage, concealment, transportation, promotion or sale of any ILLEGAL AND UNAUTHORIZED DRUGS, SYNTHETIC/DESIGNER DRUGS, CONTROLLED SUBSTANCES (EXCEPT LEGALLY PRESCRIBED DRUGS) OR DRUG RELATED PARAPHERNALIA by CONTRACT WORKER is strictly prohibited on all company properties, job sites or work areas during work hours and/or while on FMC property or on FMC related business.
 - b. The use, abuse, presence in the body or reporting to work under the influence, bringing onto company property, unlawful manufacture, distribution, dispensation, possession, purchase, transfer, storage, concealment, transportation, promotion or sale of alcohol by any person is strictly prohibited on all company properties, job sites or work areas during work hours and/or while on FMC property or on FMC related business.
 - c. CONTRACT WORKERS undergoing prescribed medical treatment with a prescription drug or using over-the-counter preparations (including, but not limited to pain killers or tranquilizers) that may affect their performance shall report this treatment use to CONTRACTOR's authorized supervisor. CONTRACTOR will determine whether worker can remain at work, and whether medical consultation or work restrictions are required.

- d. ILLEGAL DRUGS are described as, but not limited to, marijuana (pot, dope, hash or hashish), cocaine (coke, rock, crack or base), LSD (acid), PCP (angel dust, crystal), MDMA (ecstasy), heroin (smack, black tar), opium, (morphine, white stuff, tar, black stuff), or any other unauthorized or unlawfully obtained drugs.

DESIGNER AND SYNTHETIC DRUGS are described as, but not limited to, ice/icecube, crank, china white, synthetic heroin, MDA, Adam, Eve, Love Drug or any other drugs that are made in clandestine laboratories where the chemists alter the molecular structure of legal or illegal drugs to create a drug that is not specifically banned by federal law.

UNAUTHORIZED ALCOHOLIC OR INTOXICATING BEVERAGES are described as, but not limited to, beer, wine or liquor.

II. COORDINATION WITH FMC

1. FMC, through its authorized representatives and agents, reserves the right, at all times, while on the FMC premises and properties and as circumstances warrant, to search and inspect CONTRACT WORKER'S possessions, including but not limited to, their lockers, baggage, desk, clothing, tool boxes, lunch boxes, brief cases, vehicles or any other such CONTRACT WORKERS are in possession, use, transportation or concealment of any of the items or substances prohibited by the policy guidelines. Any CONTRACT WORKER found to be in violation of these Guidelines shall be removed immediately pending further investigation. If violation is substantiated, administrative action up to and including removal and barring from FMC property will be imposed.
2. CONTRACT WORKERS on FMC sites shall be certified substance free prior to commencement of work on the FMC site.

a. PREACCESS TESTING

CONTRACTOR agrees to certify to FMC that every one of its CONTRACT WORKERS assigned to FMC has been tested and confirmed negative for substance abuse within the previous thirty (30) days of assignment to an FMC site and that the test has been confirmed negative for illegal substances as described in Paragraph I.3 and defined in Paragraph III.2. CONTRACT WORKERS who have been absent from an FMC site for a period of thirty (30) days or longer are considered to be new assignees should they return to the site for work, and

as such CONTRACTOR shall certify to FMC that the CONTRACT WORKER has been tested and confirmed negative for substance abuse within the previous thirty (30) days of their reassignment.

b. CURRENT EXISTING CONTRACTS

CONTRACTOR further agrees that within thirty (30) days after these Guidelines are implemented at an FMC site, all of its CONTRACT WORKERS already assigned to the FMC site shall be tested and confirmed negative for substance abuse, although they may continue in their assignment while awaiting test results.

c. CONTRACT WORKER ANNUAL TESTING

Annually, CONTRACTOR shall certify to FMC that every one of its CONTRACT WORKERS continuously assigned to an FMC site for a period of one year, or longer, has been tested and confirmed negative for substance abuse within thirty (30) days of the anniversary date of assignment to the FMC site. Any CONTRACT WORKER testing positive for drugs or alcohol and properly confirmed shall be removed from any work assignment on an FMC site.

3. "For Cause" testing of any CONTRACT WORKER (including Urine and Blood Sampling and/or Breath Analysis Testing) may be conducted without prior announcement when there is a reasonable suspicion. It shall be the responsibility of the CONTRACTOR whose worker is being tested to have the appropriate test(s) performed when reasonable suspicion exists. Testing will be performed with concern and respect for the personal privacy and dignity of the CONTRACT WORKER. "For Cause" is defined by, but not limited to, the following circumstances:

- a. When a supervisor has reasonable suspicion or cause to suspect that a CONTRACT WORKER shows signs of possible intoxication, is using or under the influence of drugs or alcohol, or when other articulable facts would lead a prudent supervisor to be concerned about the individual's safety or the safety of the general public and others due to the CONTRACT WORKER'S physical condition or behavior while working.
- b. A urine and/or blood test is required when a CONTRACT WORKER is found in possession of suspected illicit or unauthorized drugs and/or alcohol, drug paraphernalia or when any of these items are found in an area used exclusively by designated CONTRACT WORKERS.

- c. A urine and/or blood test is required when a CONTRACT WORKER suffers an on-the-job injury which requires a visit to a doctor (as allowed by law) or following a serious or potentially serious accident or incident in which safety precautions were violated, unsafe instructions or orders were given, equipment or property was damaged (including, but not limited to, automobiles, trucks and other equipment), unusually careless acts were performed, or where the cause was due to a CONTRACT WORKER's failure to wear prescribed personal protective equipment, or follow prescribed safety rules while working on company premises or while on FMC property or FMC related business.
- d. In the case of unusual circumstances where employee error can not be ruled out, FMC reserves the right to demand urine and/or blood tests conducted for all involved CONTRACT WORKERS.

III. ENFORCEMENT

- 1. CONTRACTOR shall be responsible for and shall monitor all substance testing of its CONTRACT WORKERS assigned to an FMC site. All testing results shall be confirmed to FMC's Safety Department Manager or FMC's designated contact by the CONTRACTOR. Upon request, CONTRACTOR shall furnish to FMC a completed and signed certification in the form of Exhibit A for each CONTRACT WORKER as requested.
 - a. CONTRACTOR shall keep and maintain all records pertaining to the substance abuse testing conducted for the FMC site for the life of the contract under which the work was performed plus one full year after the fulfillment of the contract or as long as required by law, whichever period is longer.
 - b. CONTRACTOR agrees to allow FMC or its agent full and complete access to its substance abuse program and to all substance abuse testing records related to applicable FMC sites for the purpose of auditing those records.
 - c. CONTRACTOR shall immediately notify FMC's Project Manager or the designated FMC contact of all positive test results. This notification shall be followed by written confirmation.

- d. CONTRACTOR shall not allow any CONTRACT WORKER access to an FMC site until all substance abuse tests have been confirmed negative if the CONTRACT WORKER was tested under any of the "for cause" provisions in Paragraph II.3.
 - e. Prior to the return to work of any CONTRACT WORKER on an FMC site, who is removed under one of the "for cause" provisions of Paragraph II.3., CONTRACTOR shall obtain a written statement from a properly licensed and practicing physician certifying that the CONTRACT WORKER is fit for duty (able to perform the exact same job and functions being performed when the CONTRACT WORKER's behavior triggered the original test).
 - f. CONTRACTOR shall not allow access to any FMC site to any CONTRACT WORKER who has been removed from any site for substance abuse and whose substance abuse test has been confirmed positive until the CONTRACT WORKER has successfully completed an approved counseling and/or rehabilitation program and has remained "clean" for at least six months after completion of the counseling and/or rehabilitation program. CONTRACTOR shall test such CONTRACT WORKERS reassigned to an FMC site on at least a three month interval for the next year. A second positive test for any such CONTRACT WORKER shall result in their being denied access to any FMC site.
2. Substance testing shall be conducted by a properly qualified and competent laboratory which follows the standards of and is certified/accredited by the National Institute on Drug Abuse (NIDA). Laboratory qualification shall be furnished to FMC's Project Manager or FMC's designated contact on a yearly basis or on demand. All samples shall be collected, sealed and transported according to the chain-of-custody protocol as defined by NIDA. Unless otherwise bound by existing laws, statutes or agreements, testing shall include, as a minimum, the following types and allowable levels of substances:

<u>Substance</u>	<u>Emit</u> <u>(nanograms/ml)</u>	<u>GC-MS Level</u> <u>(nanograms/ml)</u>
Amphetamines	1000	500
Alkaloids, Opiates (Heroin, Morphine, Codeine)	300	300
Barbiturates	300	300
Benzodiazepines (eg., Valium, Librium)	300	300
Cannabinoids (THC, Marijuana)	50	15
Phencyclidine (PCP, Angel Dust)	25	25
Methamphetamine	500	500
Methadone	300	300
Methaqualone (Qualudes)	300	300

3. CONTRACTOR shall insure that all CONTRACT WORKERS assigned to an FMC project or site read and sign a copy of Exhibit B, which confirms that CONTRACTOR's substance abuse policy applies to all work performed on an FMC site or while on FMC related business and which provides notice of FMC's right to conduct or to have conducted searches in accordance with these Guidelines. A copy of the completed and signed statement must be on file with CONTRACTOR prior to assignment of such workers, except as provided in Paragraph II.2.b..
4. Violation of any of the provisions of these Guidelines is strictly prohibited and will be proper cause for administrative action by FMC, up to and including termination of this contract and removal and barring of the CONTRACTOR from FMC property.
5. Prior to the commencement of work, CONTRACTOR shall place on file with FMC's Project Manager or FMC's designated contact its Substance Abuse Policy and written procedures for the implementation and administration of that policy.

EXHIBIT A

**WORKER PREASSIGNMENT SUBSTANCE TEST
CERTIFICATION**

WORKER NAME _____ DATE _____

SOCIAL SECURITY NUMBER _____ EMPLOYER _____

DATE SAMPLE TAKEN _____

NAME OF TESTING LABORATORY _____

TEST UTILIZED FOR SCREEN _____

SCREEN TEST RESULTS _____

CONFIRMATORY TEST UTILIZED _____

CONFIRMATORY TEST RESULTS _____

I hereby certify the above test results to be correct to the best of my knowledge.

EMPLOYER NAME _____

BY _____

NAME (PRINTED) _____

TITLE _____

DATE _____

VERIFIED BY: PRIME CONTRACTOR NAME _____

BY _____

NAME (PRINTED) _____

TITLE _____

DATE _____

EXHIBIT B

ACKNOWLEDGEMENT AND POLICY STATEMENT

I hereby acknowledge that I have received a copy of my Employer's substance abuse policy. I have read this policy, I understand its provisions and requirements, and I agree to submit to all of its provisions and requirements during my FMC assignment, including provisions related to substance abuse testing. I fully understand that compliance with this policy is a condition of my being allowed to enter and/or remain working on FMC property or on FMC related business.

I also acknowledge that access to any FMC work location, plant site, project site, offices or vehicles is conditional on FMC's right to search the entrant's personal property and effects and vehicle for illegal and/or unauthorized substances, contraband and drug paraphernalia.

Illegal substances as defined by federal and state law and by my employer's substance abuse policy include, but are not limited to, marijuana and hashish, cocaine, heroin, opium, hallucinogens, synthetic and designer drugs, alcoholic or other intoxicating substances, paraphernalia, and depressants or stimulants not prescribed by a licensed physician for current personal treatment.

Worker Signature _____

Worker Name (Printed) _____

Date _____ Worker Social Security Number _____

Employed By _____

Verified By: Signature _____

Name (Printed) _____

Title _____

Company Name _____

FMC Contractor Safety Manual

ATTACHMENT A-3

REFERENCE NUMBERS TABLE OF CONTENTS

Contractor Safety Manual Numbers	Reference Number	Attached to Safety Manual	Reference Title
A1-C	2.7.2 Form 52	x	Contractor Safety Guide-Guidelines Contractor Safety Guidelines
A17-C	2.5.1	x	Phosphorus Mandatory Safety Standards
A18a-C A18b-C A18c-C A18d-C	2.1 & 2.5.1		
A18e-C A18f-C A18g-C	2.6.9 2.1		
A18i-C	2.4.12	x	Inspection of Personal Safety Harnesses
A18i-C	2.9.6		Noise Control
A21-C	7.2		Hazard Communication
A23-C	2.9.1.1 Through 2.9.1.24		Hazardous Work Requiring Hazardous Work Permit
A26-C	2.9.6		Noise Control
A27-C	2.9.15	x	Asbestos Policy and Procedures
A28-C	2.9.16		PCB
A30-C	2.1.6 2.1.3	x x	Barricades Protective measures for wall, floor, roof, or ground openings, roof perimeters and elevated work platforms
A31-C	Emergency Control Manual		

REFERENCE NUMBERS TABLE OF CONTENTS

Contractor Safety Manual Numbers	Reference Number	Attached to Safety Manual	Reference Title
A33-C	6.1 6.2 6.4 (2.1.1)	x	Phosphorus poisoning, Burns Hazards, Toxicity, First Aid and Medical Treatment
A35-C	2.1.9	x	Plant LO & TO Procedure
A36-C	2.3.1	x	Color Code
A40-C	2.1.8 2.1.8.1	x x	Safe Use of Portable Ladders Portable Metal Ladders
A41-C	2.1.7	x	Safe Use of Scaffolding
A43-C	2.4.2	x	Inspecting Powered Hand Tools
A44-C	2.2.11	x	Horizontal & Bench Grinders



POCATELLO

SAFETY MANUAL

PLANT SAFETY RULES (GENERAL)

NUMBER: 2.1.1
DATE OF ISSUE: 9/87
PREPARED BY: MLRodes
APPROVED BY: *John H. Harkins*
SUPERSEDES: 1/83
PAGE 1 OF 3

SCOPE

General plant safety rules should compose the code of conduct expected of all employees. They frequently will refer to more detailed policies and procedures contained in your plant safety manual.

GENERAL SAFETY RULES

Below are listed examples of general plant safety rules. Each plant can use them as a basic starting point and add or delete as fits individual requirements.

1. All injuries occurring at this plant, no matter how minor, shall be reported. If possible, report the injury to your foreman and request permission to report to the Dispensary or the Guard on duty in the Gatehouse for proper medical attention. If the foreman is not available, ask a fellow worker to cover your job responsibilities before reporting to the Dispensary or Guard. After receiving medical attention, report to your foreman as soon as possible. Anyone injured at this plant and requiring medical attention after leaving shall contact the Guard on duty for assistance in obtaining medical attention.
2. An approved safety hat must be worn at all times on company property except in office areas enclosed with four walls and a roof; the Stores and Maintenance building, the Boiler House, Panel Board rooms, the Change House, area west of the Stores and Maintenance building north of the Phosphorus Spur Track, and east of the plant parking lot. Hard hats need not be worn in the cabs of mobile equipment, while walking from the Main Office complex to the Phosphorus department offices, or from the inplant parking area to the Main Office complex. In addition, hard hats must be worn immediately outside all Mobile Shop doors, unless it is absolutely impossible to wear a hat while performing work; bending into or laying under or working inside machinery. While performing work in the Mobile Shop Bench area, hard hats will not be required. All other areas inside the shop, hard hats are required except when it is not feasible while bending over or working inside or under machinery while actually performing work.
3. Approved eye protection must be worn at all times on company property except for special areas enclosed with four walls and a roof; area west of Stores and Maintenance building, and north of the Phosphorus Spur Track. Safety glasses are also not required when walking from the Main Office complex to the Phosphorus department offices, or from the Main Office complex



POCATELLO

SAFETY MANUAL

PLANT SAFETY RULES (GENERAL)

NUMBER: 2.1.1
DATE OF ISSUE: 9/87
PREPARED BY: MLRodes
APPROVED BY: *[Signature]*
SUPERSEDES: 1/83
PAGE 2 OF 3

to the Maintenance lavatories south door, or while traveling to or from any authorized employee parking area. However, if manual labor is being performed in any of these areas, those workmen performing the manual labor must wear safety glasses.

4. Approved respiratory protection is required in those areas so labeled.
5. Each employee shall wear any additional personal protective equipment as instructed by his foreman or dictated by departmental safety procedures.
6. No employee shall operate any equipment other than that necessary to perform his assigned duties, except in an emergency to prevent accident, further personal injury, or damage to equipment.
7. Hold tags shall be used in accordance with the procedure.
8. Personnel will not ride on any equipment except in a passenger seat on the inside of the bed or body of a truck equipped with sideboards. Standing in the bed, on tailgates, fenders, bumpers and/or sitting on sideboards, tailgates, fenders, bumpers or riding in the buckets of front-end loaders is strictly prohibited.
9. No employee shall ride on any conveyor, hook, sling, or load or material being transported.
10. Excavations and hazardous work areas shall be provided with warning signs and properly erected barricades.
11. Each employee shall maintain good housekeeping in his assigned work area.
12. Each employee shall comply with all regulatory signs posted within the company property.
13. No employee shall indulge in practical jokes or horseplay on company property.
14. Only ladders that are in safe condition are to be used. All ladders being used must have had current inspection as outlined in the plant ladder inspection procedure.



POCATELLO

SAFETY MANUAL

PLANT SAFETY RULES (GENERAL)

NUMBER: 2.1.1
DATE OF ISSUE: 9/87
PREPARED BY: ML Rodes
APPROVED BY: *FA Heston Jr*
SUPERSEDES: 1/83
PAGE 3 OF 3

15. Unsafe conditions should be reported immediately to your foreman.
16. Fire fighting equipment shall be used for fire fighting only unless authorized by your supervisor. When it is necessary to use an item of fire fighting equipment, such use shall be immediately reported to your foreman. Do not go to the scene of a fire unless you have direct responsibility there.
17. The speed limit on plant streets is 10 miles per hour. There is no speed limit for slag haul units operating on haul roads.
18. No one shall enter another department without his foreman's permission.
19. No unauthorized person should ever start or shutdown a piece of equipment without first having received permission from the foreman of that department in which work is being done.
20. Proper tools are to be used when performing any job. All tools used are to be in safe condition. Defective tools are to be tagged, marked "defective" and returned to a repair station.
21. Restroom facilities are provided throughout the plant and they are to be used without exception.



POCATELLO

SAFETY MANUAL

PROTECTIVE MEASURES FOR WALL, FLOOR, ROOF,
OR GROUND OPENINGS, ROOF PERIMETERS AND
ELEVATED WORK PLATFORMS

NUMBER: 2.1.1
DATE OF ISSUE: 3/83
PREPARED BY: GFC
APPROVED BY: FHH/8
SUPERSEDES: 27-1/
PAGE 1 OF 1

In order to assure adequate protection against falls and against falling objects resulting from wall, floor, roof, or ground openings, roof perimeters and elevated work platforms, it shall be the policy of the Pocatello Plant to assure all such openings are provided with adequate guarding measures as required under the Federal Occupational Safety and Health Act.

Any wall, floor, roof or ground openings, roof perimeters and elevated work platforms (temporary or permanent) which presents a potential hazard to personnel shall be substantially covered or provided with personnel protection in compliance with the Federal Occupational Safety and Health Act (Top and internal rail of 2x4 lumber or 1 1/2 inch pipe or 2"x2"x3/8" angles, 8 feet or less in length).

Rope or chain type barricades shall be considered adequate protection only if they are placed a minimum of 10 feet back from the perimeter of the opening, and no persons are permitted within the roped off area unless they are wearing an approved and properly adjusted and secured safety belt and lifeline and then only upon direct instruction from his immediate supervisor or foreman.

FMC
POCATELLO
SAFETY MANUAL

NUMBER:	2.1.6
DATE OF ISSUE:	7/91
PREPARED BY:	DHK
APPROVED BY:	JTB
SUPERSEDES:	<i>JB</i>
PAGE:	1 OF 2

BARRICADES

I. PURPOSE

The purpose of a barricade is to isolate a specific area, object, task, etc., such as a hazard, an area of storage, a freshly painted area, or to isolate an area for security reasons.

II. TYPE

1. Barricades may consist of rope, tape, strings of pennants, wooden or metal horses, pipe, wood rails, etc.
2. Barricades erected around excavations, indentations, floor openings, open sided floors, etc., if less than four feet above the ground or adjacent to the floor, may be of rope, chain, or any other flexible material, provided they are placed no closer than 6' from the edge of the hazard.
3. Barricades erected at the edge of excavations, indentations, floor openings, open sided floors, etc., shall conform to OSHA standards for guardrails, 1910.23, paragraph (e) as follows:
 - A. A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42" nominal from the upper surface of the top rail to the floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.
 - B. For wood railings, the posts shall be of at least 2" by 4" stock spaced not to exceed 6'. The top and intermediate rails shall be of at least 2" by 4" stock. If the top rail is made of two right-angle pieces of 1" by 4" stock, posts may be spaced on 8' centers, with 2" by 4" intermediate rail.
 - C. For pipe railings, posts, top, and intermediate rails shall be at least 1 1/2" nominal diameter with posts spaced not more than 8' on centers.
 - D. For structural steel railings, posts, top, and intermediate rails shall be of 2" by 2" by 3/8" angles or other metal shapes of equivalent bending strength with posts spaced not more than 8' on centers.

FMC
POCATELLO
SAFETY MANUAL

NUMBER: 2.1.6
DATE OF ISSUE: 7/91
PREPARED BY: DHK
APPROVED BY: JTB
SUPERSEDES:
PAGE: 2 OF 2

BARRICADES

- E. The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 lbs. applied in any direction at any point on the top rail.

III. PROCEDURE

1. Barricades or barriers shall be placed in such a manner as to completely isolate the area or object.
2. Individuals placing barricades of yellow ribbon, rope, strings, etc., are responsible to assure that not less than two properly completed yellow tags (specific reason for barricade, signed and dated) are conspicuously attached to the barricade.
3. No person shall enter any yellow tag barricaded area until they have received authorization from the individual who caused the barricade to be erected or allowed by the instructions on the tag or from the foreman or supervisor in charge of the barricaded area, process, or equipment.
4. Individuals placing barricades of red ribbon, rope, strings, etc., are responsible to assure that not less than two properly completed red tags (specific reason for barricade, signed and dated) are conspicuously attached to the barrier.
5. No person shall enter any red tag barricade area.
6. The individual who caused the barricade to be erected, foreman, or supervisor in charge of the area, process, or equipment barricaded, is responsible to assure the barricade is removed when it is no longer needed.



POCATELLO

SAFETY MANUAL

SAFE USE OF SCAFFOLDING

NUMBER: 2-1
DATE OF ISSUE: 1-8
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-1
PAGE 1 OF

SCOPE

Following basic safety considerations when using scaffolding is necessary to prevent serious injuries.

PROCEDURE

A. General Procedures.

1. Before starting work on a scaffold, inspect visually to determine that:
 - a. Handrails, toeboards and decking are in place.
 - b. All wheels are locked on movable scaffolds.
 - c. Locking pins are in place at each joint.
 - d. A tag that shows whether it is complete or incomplete, and the conditions under which it may be used is secured to the scaffold.
2. Personnel must wear properly tied off safety belts on any scaffold platform that is six feet or more above grade and not equipped with standard handrails, midrails, or complete deck.
3. Do not change or remove scaffold members. Any changes must be made only as permitted by site management.
4. No one is allowed to ride on a rolling scaffold when it is being moved. Remove or secure all tools and material on the deck before moving.
5. Do not climb on, or work from, any scaffold handrail, midrail, or brace member. Use the ladder to get on the scaffold.
6. The erection of a scaffold exceeding 50 feet above the base plates must be approved by the project management.
7. All scaffolds must be erected level and plumb, on a firm base.
8. Scaffolds must be tied off or stabilized with outriggers when the height is more than three times the smaller base dimension. Scaffolds must also be tied off horizontally every 30 feet.
9. When space permits, all scaffold platforms must be equipped with standard 42-inch-high handrails rigidly secured (not wired), standard 21-inch-high midrails, completely decked with safety plank or manufactured scaffold decking, and rigidly secured toeboards on all four sides.
10. Adjusting or leveling screws shall not be used on scaffolds equipped with wheels. Adjusting screws shall not be extended more than 12 inches of thread.



POCATELLO

SAFETY MANUAL

SAFE USE OF SCAFFOLDING

NUMBER: 2.1.7
DATE OF ISSUE: 1-83
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-16
PAGE 2 OF

11. Check with the supervisor for safe working loads on all scaffolds.
 12. Rolling scaffolds shall be used only on level, smooth surfaces, or the wheels must be contained in wooden or channel iron runners. Watch for overhead clearance when moving.
 13. Do not alter any scaffold member by welding, burring, cutting, drilling, or bending.
 14. Do not rig from scaffold handrails, midrails, or braces.
- B. Specific cases.
1. Patented Metal Scaffolding.
 - a. Generally, parts and sections of scaffolding made by one manufacturer are not to be used with another manufacturer's.
 - b. Check with the supervisor.
 2. Suspended Scaffolding.
 - a. Swinging stages, toothpicks, boatswain ("bos'n") chairs, floats, and needle beams require special approval by the foreman.
 - b. Attach and secure safety belt before stepping on these scaffolds and do not remove until clear of the scaffold. Tie off to independent lifeline or building structure, one lifeline per person.

SCOPE

Ladder accidents usually result from faulty care or improper use of ladders. Some of the most frequent causes of accidents are: using a broken ladder, improper climbing procedure, improperly securing the ladder, selecting the incorrect ladder for a job, reaching too far to the side and hand-carrying loads up or down the ladder.

POLICY

1. Only wood or re-enforced plastic ladders meeting American National Standards Institute specifications and stamped with such approval shall be purchased for use at this plant.
2. All straight ladders shall be equipped with safety type feet, and shall be positioned at such a pitch that the horizontal distance from the top support to the foot of the ladder is approximately 1/4 of the working length of the ladder.
3. All straight ladders, when in use, shall be securely lashed or held in position.
4. Step ladders, when used, must be fully opened and the spreader locked.

SAFETY RULES

1. Ladders should be stored in such a manner as to provide ease of access or inspection, and to prevent danger of an accident when withdrawing a ladder for use.
2. Wood ladders, when not in use, should be stored at a location where they will not be exposed to the elements, but where there is good ventilation. They shall not be stored near radiators, stoves, steam pipes, or other places subjected to excessive heat or dampness.
3. Ladders stored in a horizontal position should be supported at a sufficient number of points to avoid sagging and permanent set.
4. Ladders carried on vehicles should be adequately supported to avoid sagging and securely fastened in position to minimize shafing and the effects of road shocks.
5. Ladders should be kept coated with a suitable protective materials. The painting of ladders is satisfactory providing the ladders are carefully inspected prior to painting by competent and experienced inspectors acting for, and responsible to, the purchaser, and providing the ladders are not for resale.



POCATELLO

SAFETY MANUAL

SAFE USE OF PORTABLE LADDERS

NUMBER: 2.1.
DATE OF ISSUE: 3/83
PREPARED BY: JMS
APPROVED BY:
SUPERSEDES: New
PAGE 2 OF 2

6. Ladders shall be inspected frequently and those which have developed defects shall be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."
7. Rungs should be kept free of grease and oil.
8. Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.
9. Ladders shall not be placed on boxes, barrels, or other unstable bases to obtain additional height.
10. When ascending or descending, the user should face the ladder.
11. Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment shall not be used. Improvised repairs shall not be made.
12. Short ladders shall not be spliced together to provide long sections.
13. Ladders shall not be used as guys, braces, or skids, or for other than their intended purposes.
14. Tops of the ordinary types of step ladders shall not be used as steps.
15. On two-section extension ladders the minimum overlap for the two sections in use shall be as follows:

Length of Ladder (feet)	Overlap (feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

NOTE: Portable metal ladders, with the exception of those built in the plant for use inside the calciner hood are not permitted to be used within the plant.



POCATELLO

SAFETY MANUAL

PORTABLE METAL LADDERS

NUMBER: 2.1.8
DATE OF ISSUE: 1-83
PREPARED BY: GFC
APPROVED BY: FHH-1
SUPERSEDES: 34
PAGE 1 OF 1

POLICY

In order to eliminate the possibility of accidental contact between portable metal ladders and energized electrical equipment, it is the policy of the FMC - Pocatello plant to prohibit the use of portable metal ladders on plant property. (see exceptions)

PROCEDURES

1. Purchasing personnel are responsible to not purchase portable metal ladders for use at this plant.
2. Maintenance and Operating supervisors are responsible to assure that all personnel under their direction are aware of and comply with this policy.

EXCEPTIONS

1. The only exception to this safety regulation is as follows:
 - a. Because of special problems, metal ladders may be used when working inside calciner hoods.



POCATELLO

HORIZONTAL AND BENCH GRINDERS

SAFETY MANUAL

NUMBER: 2.2
DATE OF ISSUE: 1-E
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-1
PAGE 1 OF

SCOPE

The bursting or breaking of abrasive wheels may cause fatal or very serious injuries if an excessive gap exists between the wheel and the tool rest. An operator's hand or fingers can be caught and crushed, and unprotected eyes are vulnerable to dust, chips, or broken wheels. These are just a few of the hazards associated with the use of grinding wheels. A sound guarding program, supplemented by safe work procedures and a good maintenance program, will minimize these hazards.

GUARDING

All abrasive-wheel machinery must be equipped with a guard so constructed that the spindle end, nut, and flange projections are covered. The angular exposure should only be large enough to allow point contact with the work. If the nature of the work is such that it entirely covers the side of the wheel, the side covers of the guard may be omitted.

On off-hand grinding machines, work rests must be installed to support the stock being worked. Work rests must be of rigid construction and be adjustable so that a maximum of 1/8 inch can be maintained between the wheel and the work rest. The tool rest should be adjusted periodically to compensate for wheel wear.

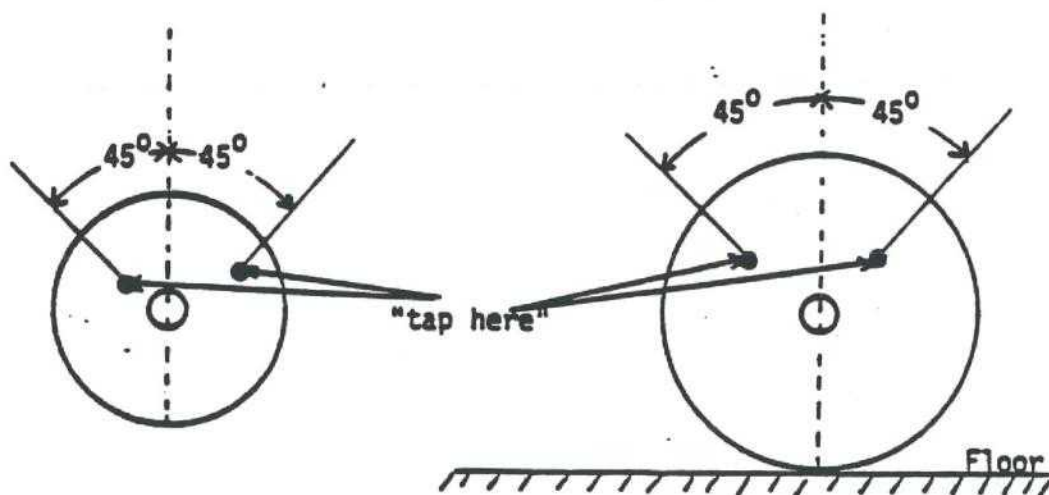
An adjustable tongue guard should also be installed near the top of the peripheral guard member and the wheel. The distance between the tongue and the wheel should never exceed 1/4 inch.

MOUNTING THE WHEEL

Procedures must be established for the close inspection of all wheels before they are mounted on the grinding unit. The wheels should be checked for cracks and given the ring test to detect internal cracks. The following inspection procedures should be followed:

- A. The spindle speed of the machine must be checked before mounting the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.
- B. The wheel should be visually inspected for cracks or other physical damage.
- C. All wheels should be given the ring test before being mounted.
 1. Wheels must be dry and free from any foreign matter when applying the test. You should note that organic bonded wheels will not emit the same clear metallic ring as vitrified and silicate wheels.

2. To conduct the test, a light disc or wheel should be suspended from its hole on a small pin or the finger (a heavy one should be placed vertically on a hard floor). The wheel or disc should then be tapped gently with a light tool such as a wooden screwdriver handle or light wooden mallet. The tap should be made at a point 45 degrees from the vertical centerline and about one or two inches from the periphery.



Tap Points for Ring Test

3. A wheel or disc in good condition will give a clear, metallic "ping" when tapped. The clarity of the ping indicates good condition.

STORAGE AND HANDLING

Abrasive wheels require careful handling to prevent dropping or bumping which can induce cracks or other damage. Those wheels that cannot be hand-carried should be transported by truck or other conveyance. Wheels should not be rolled across the floor.



POCATELLO

SAFETY MANUAL

HORIZONTAL AND BENCH GRINDERS

NUMBER: 2.2.1
DATE OF ISSUE: 1-83
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-15-
PAGE 3 OF 4

- A. Abrasive wheels should be stored in a dry area which is not subject to extreme temperature changes, especially below freezing. Wet wheels may break if stored below 32°F.
- B. If wheels are stored in a cold room (above 40°F), they should be allowed to warm up for several hours before being used.
- C. Wheels should be stored in racks as close to the grinding operation as possible (to minimize handling).
- D. Manufacturer's recommendations must be followed regarding storage life of the wheels.
- E. Wheels should not be dropped, bumped, or rolled across the floor.

INSPECTION

Daily inspections should be made by the operator to ensure that the equipment is in safe operating condition. A more stringent procedure should be required on a weekly basis. The results of these inspections and any repairs should be documented on the Grinder Checklist (Exhibit 2.2.11.1) maintained on file.



POCATELLO

SAFETY MANUAL

FORM 1021
GRINDER CHECKLIST

NUMBER: 2.2.
DATE OF ISSUE: 1-83
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-15-
PAGE 4 OF 4



GRINDER CHECKLIST

Type _____	RPM _____	
Size _____	Peripheral speed _____	
Item	Satisfactory	Unsatisfactory
Head:		
Securely fastened	<input type="checkbox"/>	<input type="checkbox"/>
Properly aligned	<input type="checkbox"/>	<input type="checkbox"/>
Glass shield:		
Clear	<input type="checkbox"/>	<input type="checkbox"/>
Unobscured	<input type="checkbox"/>	<input type="checkbox"/>
In place	<input type="checkbox"/>	<input type="checkbox"/>
Work rest:		
Securely fastened	<input type="checkbox"/>	<input type="checkbox"/>
Within 1/8 inch of the wheel	<input type="checkbox"/>	<input type="checkbox"/>
Tongue guards:		
Securely fastened	<input type="checkbox"/>	<input type="checkbox"/>
Within 1/16 inch of the wheel	<input type="checkbox"/>	<input type="checkbox"/>
Frame:		
Securely mounted	<input type="checkbox"/>	<input type="checkbox"/>
No vibration	<input type="checkbox"/>	<input type="checkbox"/>
Wheel face:		
Well lighted	<input type="checkbox"/>	<input type="checkbox"/>
Dressed evenly	<input type="checkbox"/>	<input type="checkbox"/>
Flanges:		
Sound size	<input type="checkbox"/>	<input type="checkbox"/>
Correct diameter (1/2 wheel diameter)	<input type="checkbox"/>	<input type="checkbox"/>
Spindles:		
Correct for wheel mounted	<input type="checkbox"/>	<input type="checkbox"/>
Guard for power belt or drive		
In place	<input type="checkbox"/>	<input type="checkbox"/>
Secure	<input type="checkbox"/>	<input type="checkbox"/>

Inspected by _____ Date _____

Department _____



POCATELLO

SAFETY MANUAL

COLOR CODE AND SIGNS FOR MARKING HAZARDS

NUMBER: 2.3.1
DATE OF ISSUE: 1-8:
PREPARED BY:
APPROVED BY:
SUPERSEDES: 6-15
PAGE 1 OF 9

SAFETY COLOR CODE FOR MARKING PHYSICAL HAZARDS

SCOPE

While never intended as a substitute for good safety measures and use of mechanical safeguards, standard colors should be used to identify specific hazards. This section should be applied to highlight exposures by the use of color coding, signs, tags, etc.

ACCIDENT PREVENTION SIGNS AND TAGS

A. RED shall be the basic color for the identification of:

1. Fire protection equipment and apparatus.

- Fire alarm boxes (pull boxes)
- Fire blanket boxes
- Fire buckets or pails
- Fire extinguishers (if painting the extinguisher is impractical or undesirable, color should be used on the housing, wall, or support to identify the location.)
- Fire exit signs
- Fire hose locations (color should be used on the reel, supports, or housing, but not on the hose).
- Fire hydrants (industrial)
- Fire pumps
- Fire sirens
- Post indicator valves for sprinkler system (it is suggested that if a traffic hazard is involved, the top should be colored red and the barrel or post yellow with black stripes).

2. Safety cans or other portable containers of flammable liquids having a flash point at or below 100°F and table containers of flammable liquids (excluding shipping containers) shall be painted red with some additional, clearly visible identification, either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow.

Red lights shall be provided at barricades and at temporary obstructions.

3. Emergency stop bars on hazardous machines shall be red. Stop buttons or electrical switches used for emergency stopping of machinery shall be red.



POCATELLO

SAFETY MANUAL

COLOR CODE AND SIGNS FOR MARKING HAZARDS

NUMBER: 2.3.1
DATE OF ISSUE: 1-83
PREPARED BY:
APPROVED BY:
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- B. ORANGE shall be used as the basic color for designating dangerous parts of machines or energized equipment which may cut, crush, shock, or otherwise injure, and to emphasize such hazards when enclosure doors are open, or when gear belt or other guards around moving equipment are open or removed, exposing unguarded hazards.
- C. YELLOW shall be the basic color for designating caution and for marking physical hazards such as:
- Striking Against
 - Stumbling
 - Falling
 - Tripping
 - Caught In Between

Solid yellow, yellow and black stripes, yellow and black checkers (or yellow with suitable contrasting background) should be used interchangeably, using the combination which will attract the most attention in the particular environment.

- D. GREEN shall be used as the basic color for designating "Safety" and the location of first aid equipment (other than fire fighting equipment).
- E. BLUE shall be the basic color for designating caution, limited to warning against the starting, use of, or movement of equipment under repair or being worked upon.
- F. PURPLE shall be the basic color for designating radiation hazards. ("Radiation" as used in this section refers to radiation types such as x-ray, alpha, beta, gamma, neutron, proton, deuteron, and meson.) YELLOW should be used in combination with PURPLE for markers such as tags, labels, signs, and floor markers.
- G. BLACK-WHITE or YELLOW-BLACK or a combination of these two shall be the basic color for the designation of human traffic and housekeeping warnings. SOLID WHITE, SOLID BLACK, single-color striping, alternate stripes of BLACK and WHITE, or BLACK and WHITE checkers should be used in accordance with location conditions.

SPECIFICATIONS FOR ACCIDENT PREVENTION SIGNS AND TAGS

SCOPE

These specifications apply to the design, application, and use of signs or symbols intended to indicate and, insofar as possible, define specific



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hazards that may lead to accidental injury to workers or the public, or both, or to property damage if not properly designated. All new signs and replacement of old signs after July 1, 1971, shall be in accordance with these specifications.

The word "sign" refers to a surface on which letters or other markings appear, prepared for the warning of, or safety instructions of, industrial workers or members of the public who may be exposed to hazards. Excluded from this definition, however, are news releases, displays commonly known as safety posters, and bulletins used for employee education.

Examples of types of signs and appropriate usage include:

- A. Danger signs should be used only where an immediate hazard exists. There shall be no variation in the type of design as signs posted to warn of specific dangers and radiation hazards. All employees shall be instructed that danger signs indicate immediate danger and that special precautions are necessary.
- B. Caution signs shall be used only to warn against potential hazards or to caution against unsafe practices. All employees shall be instructed that caution signs indicate a possible hazard against which proper precaution should be taken.
- C. Safety instruction signs shall be used where there is a need for general instructions and suggestions relative to safety measures.

The colors, proportions, and location of the identification panels on each sign shall be in accordance with this manual. (Standard proportions for danger, caution, safety and directional signs are included on pages 8 and 9.) All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard. The colors red, black, and white shall be those of opaque glossy.

Standard color usage for appropriate signs shall be as follows:

- A. Standard color of the background shall be white, and the panel black, except the oval portion which is to be red with white letters. The line designating the oval is to be white. Any letters against the white background shall be black.
- B. Caution Signs - Standard color of the background shall be YELLOW, and the panel BLACK and YELLOW letters. Any letters used against the YELLOW background shall be black.
- C. Safety Instruction Signs - Standard color of the background shall be WHITE, and the panel GREEN with WHITE letters. Any letters used against the white background shall be black. The colors shall be those of opaque glossy.



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- D. Directional Signs - Standard color of the background shall be WHITE, and the panel BLACK with WHITE directional symbol. Any letters used against the white background shall be black.
- E. Information Signs - BLUE shall be the standard color for informational signs. It may be used as the background color for the complete sign or as a panel at the top of such types of "Notice" signs, which have a white background.

SYMBOLS USED ON SIGNS

The listings in this section are intended to serve as a guide for choosing the correct sign design for the message to be displayed. The wording of any sign should be easily read and concise. The sign should contain sufficient information to be understood easily. The wording should make a positive, rather than negative suggestion, and should be accurate in fact.

SAMPLES OF TYPICAL WORDINGS

A. Danger Signs

Danger - Keep Off, Electric Current
Danger - No Smoking, Matches, or Open Lights
Danger - Men Working Above
Danger - Not Room Enough to Clear Men on Cars
Danger - Keep Away
Danger - Men in Boiler
Danger - Insufficient Clearance
Danger - 2,300 Volts
Danger - Keep Out
Danger - Crane Overhead
Danger - Keep Off

B. Caution Signs

Caution - Do Not Operate, Men Working on Repairs
Caution - Hands Off Switch, Men Working on Line
Caution - Working on Machines, Do Not Start
Caution - Goggles Must be Worn when Operating this Machine



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- Caution - This Door Must be Kept Closed
- Caution - Electric Trucks - Go Slow
- Caution - This Space Must be Kept Clear at All Times
- Caution - Stop Machinery to Clean, Oil, or Repair
- Caution - Keep Aisles Clear
- Caution - Operators of this Machine shall Wear Snug-Fitting Clothing -
No Gloves
- Caution - Close Clearance
- Caution - Watch Your Step
- Caution - Electric Fence

C. Safety Instruction Signs

- Report All Injuries to the First Aid Room At Once
- Walk - Don't Run
- Report All Injuries no Matter how Slight
- Think - If Safe, Go Ahead
- Make your Workplace Safe before Starting the Job
- Report All Unsafe Conditions to your Foreman
- Help Keep this Plant Safe and Clean

D. Directional Signs

- This Way Out (below arrow panel)
- This Way (inside arrow), Out (below arrow panel)
- Fire Exit (below arrow panel)
- Fire (inside arrow), Extinguisher (below arrow panel)
- To the (inside arrow), Fire Escape (below arrow panel)
- To the (inside arrow), First Aid Station (below arrow panel)
- Manway (below arrow panel)
- This Way to (inside arrow), First Aid Room (below arrow panel)

E. Informational Signs

- No Trespassing Under Penalty of the Law
- This Elevator is for Freight Only, Not for Passengers



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No Admittance Except to Employees on Duty
No Admittance
No Admittance, Apply at Office
Men
Women
For Employees Only
Office

ACCIDENT PREVENTION TAGS

SCOPE

The purpose of this section is to establish a set of specifications for tags based on experience and previous use. Tags are a temporary means of warning all concerned of a hazardous condition, defective equipment, radiation hazard, etc. The tags are not to be considered as a complete warning method, but should be used until a positive means can be employed to eliminate the hazard. For example, a "Do Not Start" tag on power equipment shall be used for a few moments or a very short time until the switch in the system can be locked out. A "Defective Equipment" tag shall be placed on a damaged ladder to be taken out of service and sent to the repair shop.

Tags are to be used to help prevent accidental injury to personnel or damage to property, or both. The word "tag" as used in this paragraph refers to a surface (usually card, paper, pasteboard, or some temporary or nonpermanent material) on which letters or marking, or both, appear. These letters or markings, or both, are for warning (cautioning) or safety instruction of employees who may be exposed to hazards. They are to be affixed to the device in question by string, wire, or adhesive.

The following are examples of accident prevention tags:

A. Do Not Start Tags

The standard background for "Do Not Start" tags shall be RED.

1. Letters shall be white or grey or etched, provided that a long-lasting and sharp contrast results.
2. "Do Not Start" tags shall be placed in a conspicuous location or shall be placed in such a manner that they effectively block the starting mechanism which would cause hazardous conditions should the equipment be energized.



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B. Danger Tags

"Danger" tags should be used only where an immediate hazard exists. There should be no variation in the type of design of tags posted or hung to warn of specific dangers. All employees should be instructed that "Danger" tags indicate immediate danger and that special precautions are necessary.

C. Caution Tags

"Caution" tags should be used only to warn against potential hazards or to caution against unsafe practices. All employees should be instructed that "Caution" tags indicate a possible hazard against which proper precautions should be taken.



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STANDARD PROPORTIONS FOR DANGER SIGNS

Sign size, inches Height Width	Black rectangular panel inches Height Width	Red Oval, inches Height Width	Word Danger, Height, inches	Maximum space available for sign wording, inches
HORIZONTAL PATTERN				
7 x 10	3-1/4 x 9-3/8	2-7/8 x 8-1/2	1-7/16	2-3/4 x 9-3/8
10 x 14	4-5/8 x 13-3/8	4-1/8 x 11-7/8	2-1/16	4-1/4 x 13-3/8
14 x 20	6-1/2 x 19-3/8	5-3/4 x 17	2-7/8	6-1/4 x 19-3/8
20 x 28	9-1/4 x 23-7/8	8-1/4 x 23-7/8	4-1/8	9-1/2 x 27-3/8
UPRIGHT PATTERN				
10 x 7	2-3/8 x 6-3/8	2-1/8 x 5-7/8	1-1/16	6-3/8 x 6-3/8
14 x 10	3-1/4 x 9-3/8	2-7/8 x 8-1/2	1-7/16	9-1/2 x 9-3/8
20 x 14	4-5/8 x 13-3/8	4-1/8 x 11-7/8	2-1/16	14 x 13-3/8
28 x 20	6-1/2 x 19-3/8	5-3/4 x 17	2-7/8	20-1/4 x 19-3/8

STANDARD PROPORTIONS FOR CAUTION SIGNS

Sign size, inches Height Width	Black rectangular panel, inches Height Width	Word "Caution" height of letter, inches	Maximum space available for sign wording below panel, inches Height Width
HORIZONTAL PATTERN			
7 x 10	2-1/4 x 9-3/8	1-5/8	3-1/4 x 9-3/8
10 x 14	3-1/4 x 13-3/8	2-1/4	5-1/2 x 13-3/8
14 x 20	3-3/4 x 19-3/8	2-3/4	9 x 19-3/8
20 x 28	4-1/4 x 27-3/8	3-1/4	14-1/2 x 27-3/8
UPRIGHT PATTERN			
10 x 7	1-5/8 x 6-3/8	1-1/8	7 x 6-3/8
14 x 10	2-1/4 x 9-3/8	1-5/8	10-1/2 x 9-3/8
20 x 14	3-1/4 x 13-3/8	2-1/4	15-1/2 x 13-3/8
28 x 20	3-3/4 x 19-3/8	2-3/4	24 x 19-3/8



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STANDARD PROPORTIONS FOR SAFETY INSTRUCTION SIGNS

Sign size inches height, width	Green rectangular panel, inches height width	Word "Think" height of letters, inches	Maximum space available for sign wording below panel inches, height, width	Green panel, inches, height width	Word "Be" height of letters, inches	Word "Careful" height of letters, inches	Maximum space available sign wording below panel, inches, height, width
7 x 10	2-3/4 x 9-3/8	1-5/8	3-1/2 x 9-3/8	3-3/8 x 9-3/8	1-1/4	1-3/16	2-1/2 x 9-3/8
10 x 14	3-1/4 x 10-3/8	2-1/4	5-1/2 x 13-3/8	4-1/4 x 13-3/8	1-3/4	2-3/16	4 x 13-3/8
14 x 20	3-3/4 x 19-3/8	2-3/4	9 x 19-3/8	6-1/4 x 19-3/8	2-1/2	3-1/8	6 x 19-3/8
20 x 28	4-1/4 x 27-3/8	3-1/4	14-1/2 x 27-3/8	9-1/2 x 27-3/8	3-1/2	4-3/8	9-1/4 x 27-3/8

STANDARD PROPORTIONS FOR DIRECTIONAL SIGNS

Sign size, inches Height, Width	Black rectangular panel, inches	White arrow, inches				Maximum space for sign wording below, panel height
		Overall length	Arrow head Height Width	Arrow shaft Height	Arrow tail Height Width	
6-1/2 x 14	3-1/2 x 13-3/8	12-5/8	2-3/4 x 3	1-1/8	2-3/8 x 3-1/4	2-1/4 x 13-3/8
9 x 20	4-1/2 x 19-3/8	18-5/8	3-3/4 x 4-1/8	1-5/8	3-1/4 x 4-1/2	3-3/8 x 19-3/8
12 x 28	6 x 27-3/8	26-5/8	5-1/8 x 5-5/8	2-1/8	4-3/8 x 6	4-3/4 x 27-3/8
15 x 36	7-1/2 x 35-3/8	34-5/8	6-3/8 x 6-7/8	2-5/8	5-1/2 x 7-1/2	6-1/4 x 35-3/8

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INSPECTION OF PERSONNEL SAFETY HARNESSES

SCOPE

Regular inspection of harnesses is an OSHA requirement. Regular, in this case, means every 1-3 months, depending upon the amount of use. The following is a guide to the adequate inspection of this equipment.

NOTE: Personnel safety harnesses are to be discarded and never used by personnel if inspected and found defective.

GUIDE

1. Closely examine the harness for any cuts or scratches on either side of the straps.
2. Fabric harnesses should not be used if considerable portions of the outer harness fibers are cut, worn through, or damaged by chemical attack.
3. Harness hardware should be examined and worn parts replaced.
4. Check each rivet on the harness to be sure it is secure.
5. Harnesses in use should not be load tested.
6. Harnesses subject to impact loading after a fall should not be reused because the fittings may have been overstressed or weakened.



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INSPECTING POWERED HAND TOOLS

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SCOPE

Any tool, whether personally or company-owned, that is defective, sufficiently damaged, or worn to a point where it becomes unsafe to use, should be repaired, replaced, or discarded. Therefore, it is necessary to inspect, in particular, hand-held electrically operated power tools, to insure they are in proper working condition. Obviously, misuse of any tool will negate good inspection procedures, and possibly lead to an injury.

A. General Safety Rules for Hand-Held Power Tools.

1. No defective power-driven tool should be used until repaired.
2. All power-driven tools must be stopped when not in use.
3. Tools which are governor-controlled should be periodically tested to determine that they are operating within the specified operating speeds.
4. All revolving or reciprocating hand-held, power-driven tools must have all set screws, keys, bolts, or projections flush or guarded.
5. All hand-held power tools must be equipped with a constant pressure switch (dead-man control), so that the power will automatically shut off when the pressure is released.
6. Power-driven nailers or staplers must be equipped with a device to prevent ejection of nails or staples when the tool is not in firm contact with the work.
7. Portable grinders must have a safety guard mounted over wheels, except a) when used on internal work, b) mounted wheels 2 inches or less in diameter, c) wheel-types 16, 17, 18R and 19 cone, d) plug-type or threaded-hole pot-balls, where the work protects the operator. The guard must cover the spindle end, nut and flange projections when possible.
8. If any explosive-actuated fastening tool is used, contact the safety department, as these tools require extreme caution in their use.
9. The power source must always be disconnected before repairing or changing any part of the tool.
10. Don't "plug in" a tool with a switch "on."
11. Wear the proper type of personal protective equipment (glasses, face shield, respirators, gloves, etc.).

B. Inspection Checklists.**1. Electric Tools.**

- a. If not the "double-insulated" type, is the tool three-wire grounded?
- b. Is the plug or cord damaged, frayed, or loose?
- c. If double insulated, is the housing cracked or damaged?
- d. Are all applicable guards in place?
- e. Do the guards function properly?
- f. Is the "trigger" or "switch" the dead-man type, so that the power automatically shuts off when released? If the tool is to be used in a wet location, then low-voltage equipment is recommended.

2. Air Powered Tools.

- a. Is the supply hose in good condition? Is it the recommended type?
- b. Is the safety chain from the hose to the tool housing connected? A safety check valve in the air line at the manifold is recommended.
- c. Is the air being supplied to the tool at the recommended pressure?
- d. On pneumatic impact tools, is the trigger located inside the handle? Is the tool-retainer installed?
- e. Is the "trigger" the dead-man type?

3. Gasoline Powered Tools (Chain Saws, Lawn Mowers, Snowblowers).

Generally, the abuse of gasoline is the most common hazard encountered.

- a. Is the gasoline stored in a safety can and appropriately labeled?
- b. Is the can equipped with a pouring spout?
- c. Is the motor shut off while refueling?
- d. Is smoking prohibited and is there any other source of ignition in the vicinity?
- e. Are fire extinguishers available?

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

PURPOSE: The Phosphorus Mandatory Safety Standards (P₄ MSS) set the base level standards and establish consistency throughout the Group when working with or around elemental phosphorus. P₄ MSS are not intended to restrict or limit each plant from developing more stringent standards as appropriate to their particular process.

SCOPE: These standards apply to all CPG locations producing, consuming or otherwise handling elemental phosphorus.

ACCOUNTABILITY: The safety and health of all employees is the highest priority objective for all FMC locations. Every employee is responsible and accountable for his/her own safety and that of his fellow employees. He/she must know and follow all safety rules and procedures which apply to the plant, the area and the tasks he/she performs. Responsibility for personal safety goes beyond following established safety rules. Each employee must think through each task before doing them and establish additional safety procedures specific to the circumstances.

Supervision and management are responsible and accountable for overall safety performance and for training employees both in established safety rules and procedures and for establishing high standards which reinforce these principles.

POLICY:

1. PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is intended to protect employees from phosphorus when working in an area of high potential exposure or when performing tasks which have significant potential for phosphorus exposure. PPE must be in good physical condition and must be worn as designed in order to be effective. PPE provides protection from direct contact with phosphorus for only a limited time of about 15 to 20 seconds. It is, therefore, imperative that a source of water is available in the immediate area. Acceptable water sources include safety tub, safety shower, or a charged water hose.

- a. Approved aluminized short coat and pants (or aluminized bib overalls and coat). Approved aluminized gear is Steel Grip AGL1136-30CAA and AGL8440G Aluminized Glass or equivalent. Aluminum gear must overlap at least 6" on coat and pants and pants must be worn over the boots with at least 4" overlap. Pants should not be so long as to drag on the ground.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS **MANDATORY SAFETY STANDARDS**

- b. Safety hard hat (hood optional)
- c. Polycarbonate full face shield (hood optional)
- d. Safety glasses (or chemical goggles).
- e. Loose fitting gauntlet-type (4" minimum skirt) gloves of rubber or leather construction. They should be loose fitting so they can be slung off. No short, wrist length gloves permitted nor are leather gloves with cloth back permitted.
- f. Rubber or non-porous treated leather boots extending above the ankle. The objective is to prevent phosphorus from entering the boot.

2. LINE BREAKING AND/OR ENTERING PHOSPHORUS EQUIPMENT

All phosphorus and phosphorus related equipment in phosphorus processing areas will be considered as phosphorus lines when maintenance and/or entering is required. Phosphorus equipment shall include but not be limited to:

- * Phossey water lines
- * P_4 jacket water
- * P_4 burners
- * Slurry lines (Pocatello)
- * P_4 lines
- Acid furnace vessels
- Steam lines
- Acid lines between P_4 furnace and storage tanks
- Acid tanks
- Condensate return lines
- * CO lines
- CO₂, nitrogen, natural gas, inert gas air connections to P_4 vessels or lines
- * P_4 cars/containers (non-routine)
- Water supply lines that connect to P_4 or phossey water lines
- All equipment downstream of P_4 furnaces (Pocatello).

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

P₄ spill containment systems
Chlorine supply to reactor

* Exceptions shall not be given under any circumstances to the "asterisked" items.

- a. Personal protective equipment, checklists, safety watch - who's only function is to provide safety protection, prework planning sessions, and work permits applicable to P₄ lines shall also be applicable to all equipment noted above. Exceptions to these standards will be allowed when a more detailed procedure is written to protect against the presence of P₄ in the equipment. Any line, vessel or equipment that can potentially contain phosphorus is presumed to contain phosphorus until supervision ensures that procedures are in place and qualified personnel ensure that it is free of phosphorus.
- b. Appropriate personal protective equipment will be worn until qualified personnel complete all the required reviews and sign off that all procedures have been completed, to render the equipment free from phosphorus.
- c. In non-P₄ areas, the risk is considered very minimal, and these procedures are not mandatory. However, the possibility of P₄ presence during line or vessel opening shall be periodically reviewed in these non-P₄ areas.
- d. When it can be determined that the possibility of phosphorus is extremely unlikely, a general procedure may be written for line opening/entering to cover these requirements.
- e. Whenever practical, backflow prevention devices should be installed on utility and process lines going to the P₄ areas.

3. TRAINING

Each plant location will develop a training program (including an annual audit system) for those tasks associated with elemental phosphorus handling. All operations, maintenance and other impacted personnel will receive initial training and subsequent annual refresher training.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

- a. Training programs at a minimum will include a plan, a standard of acceptable performance, a recordkeeping system to document qualifications and plans for refresher training.
 - b. Personnel are forecast (budgeted) to conduct and receive the training. Instructors should be selected on previously developed criteria to ensure excellence.
4. ENGINEERING STANDARDS
SECTION TO BE DEVELOPED BY THE P4MMS DIVISION TASK FORCE.
5. DRILLS
- a. Each plant will have a minimum of four simulated phosphorus emergency drills per year. These should include the use of equipment to contain the emergency and should cover both day shift and back shifts and should occur on each unit to maximize response exposure. Newly assigned personnel will be trained before assuming full job responsibility.
 - b. A complete emergency plan is necessary, incorporating adequate alarm and communication systems.
6. MARKING OF DANGEROUS AREAS (permanent and temporary)
- a. Each plant must clearly identify those areas which are hazardous and require all protective clothing and entry restrictions. The areas are to be clearly marked (as hazardous phosphorus areas which require minimum protective clothing) and entry restricted to authorized personnel only.
7. IDENTIFICATION OF PHOSPHORUS LINES
- a. All lines containing phosphorus, slurry, or phossey water are to be permanently identified according to individual plant standards and applicable regulatory requirements.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

8. FLANGE AND PUMP SEAL COVERS, FLANGE GASKETS

- a. Flange covers - All lines used specifically for handling elemental phosphorus and slurry are to have effective flange covers. Flange covers for lines carrying phosphy water will be used in high exposure/risk areas as determined by each plant.
- b. Flange gaskets - Asbestos or equivalent material is the preferred gasket material for phosphorus, phosphy water and slurry line flanges. Plastic materials such as Teflon are not suitable for gaskets in impedance heated phosphorus lines.
- c. Pump seal covers - All phosphorus, phosphy water and slurry pumps which have seals in exposed locations (i.e., not contained within a pit or tank) are to have effective covers.

9. PHOSPHORUS LOADING/UNLOADING

- a. The P_4 loading/unloading area will be clearly defined and be restricted to authorized personnel only.
- b. Personnel protective equipment must be worn in the area at all times during the heating, loading, and unloading process.
- c. Safety tubs and a water deluge system must be in place and properly maintained and tested on a routine basis.
- d. Two means of egress from the P_4 cars must be provided with a safety tub at each egress.
- e. A safety watch with a charged water supply must be assigned when anyone is on top of a phosphorus car operating valves, connecting or disconnecting lines.
- f. The heating cycle of the car must be controlled according to plant standard procedure.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

- g. The thermocouple holder and water overflow gooseneck must be directed away from the work area.
- h. No instrument should be forced into a car, but must drop on its own. If forcibly removing that instrument ever becomes necessary, a deflector must be available to protect the operator.
- i. Any unusual problems must be reported to supervision before additional work is done on the car.
- j. DOT Regulations will be followed for loading and unloading cars.

10. SAFETY SHOWERS AND TUBS

- a. An effective safety shower, safety tub or deluge system will be provided in phosphorus handling areas and at potential exposure points.
- b. Safety tubs will be provided at the burner level and at phosphorus loading/unloading areas.
- c. A charged water hose with pressure and flow adequate for the exposure may be used as an alternate to tubs or showers in remote areas.
- d. Alarms will be provided for tubs and showers in remote areas unless an approved alternate procedure for communications is used.

11. PHOSPHORUS LINE UNPLUGGING

All plants should make a maximum effort to free the line of phosphorus and/or sludge prior to opening a line. If a line plugged with phosphorus does have to be opened, the following minimum standards apply when trying to free the plugged section:

- a. A preplanning session with appropriate operators, mechanics and supervisory personnel must be held for the unplugging of any line plugged with P_4 , except for routine jobs where a detailed procedure exists (such as P_4 dip tubes at the Lawrence P_2S_5 plant).
- b. All standard phosphorus protective equipment is to be used during the unplugging work.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

- c. Area is to be barricaded and warning signs in place.
- d. Standby personnel will be available with charged water hose with pressure flow adequate for the exposure.
- e. The job is to be arranged so that the cleared P_4 can be safely controlled when it leaves the line.

12. LINE PURGE PROCEDURES

Each plant will have a phosphorus line purge procedure and checklist which verifies the line is open and depressurized.

13. UTILITY LINES CONNECTED TO PHOSPHORUS LINES

- a. No line which ties into a P_4 , slurry, phosphy water or jacket water line will be broken open while under pressure.
- b. Whenever practical, backflow prevention devices should be installed on utility and process lines which tie into P_4 , slurry, phosphy water, and jacket water lines.
- c. Each location must have a procedure for proper use, inspection and replacement of backflow prevention devices.
- d. Check valves used as backflow prevention devices should always be handled under the assumption that they have leaked allowing phosphorus behind them. Treat the upstream side as a phosphorus line until visual verification shows no phosphorus present.
- e. When backflow prevention devices are not used on a utility line which connects to a P_4 line, that utility line will be treated as a P_4 containing line.

14. INSPECTION OF PHOSPHORUS LINES

- a. All plants will have an inspection program for phosphorus lines to verify structural integrity.
- b. Special emphasis is to be given to elbows and tees.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS MANDATORY SAFETY STANDARDS

15. COMMUNICATIONS

- a. All OSHA or MSHA recordable phosphorus burns with initial investigation results will be reported to the manufacturing director and the CPG Safety and Health Manager within 24 hours.
- b. Effective communications will be established between plants handling phosphorus. Communications include:
 - o All phosphorus burns will be reviewed by the P₄MSS division task force on an annual basis.
 - o Additions or improvements necessary in the P₄MSS
 - o Significant plant incidences.
 - o Operating and maintenance safety improvements (including piloting studies)
 - o Changes in safety procedures (manuals)
 - o Design engineering criteria
 - o Advances in state of the art technology
 - o Revisions in phosphorus handling procedures
- c. In-plant communications will be established to disseminate necessary information to effected employees.
- d. The minimum phosphorus safety standards will be reviewed a minimum of every two years or more frequently as required. The P₄MSS division Task Force will have the responsibility to coordinate the review.



POCATELLO
SAFETY MANUAL

CONTRACTOR SAFETY GUIDELINES

NUMBER: 2.7.2
DATE OF ISSUE: 1/83
PREPARED BY: LJH
APPROVED BY: *[Signature]*
SUPERSEDES: 52-8/81
PAGE 1 OF 8

FMC - POCATELLO

CONTRACTOR SAFETY GUIDELINES

We are concerned with the safety of our employees and also with the safety of you and your employees. For this reason, it is necessary that you understand the following points which will be discussed with you, and you insure that each of your employees will be made aware of this information. Your signature on FMC Form 75, "Contractor Safety Guidelines", will verify you have received these rules for review with your personnel.

To verify that you have reviewed this information with your employees, you are required to give the FMC project supervisor the yellow copy of a signed Form 100, "Information for Contract Employees", for each of your employees on that project prior to his arrival at the job site.

We wish to point out there are many safety rules, regulations, and requirements necessary for working at this plant. The ones we are going to discuss are simply the basic general instructions. If you have any doubt, or questions concerning safety regulations, rules, or requirements while working at the plant, contact the FMC individual in charge of your project.

GENERAL

1. Each of your employees is required to report to and sign the register in the contractor gatehouse on his initial entrance to the plant. He may then be given an identification badge and time card. The badge will be worn in plain sight at all times when he is in the plant. He shall also punch his, and only his, time card each time he enters or exits FMC property. Upon termination of the employee, or contract work, all badges will be returned to the contractor gatehouse. Contractor employees and vehicles entering or leaving this plant will do so by means of the contractor gate located at the west end of the plant parking lot. In the event this gate is not staffed, the FMC employee in charge of the project will direct you to the main gate.
2. If an employee loses or forgets his identification badge, he will upon identification by his supervisor or by the FMC employee in charge of the project, be issued a temporary replacement badge.
3. Parking of personal automobiles belonging to contractor personnel is limited to the contractor parking lot just west of the plant main parking lot.
4. All contractor vehicles authorized "at will" entrance into the plant operating areas will be issued an "FMC Contractor Vehicle Identification Placard". This identification placard will be displayed at all times while on plant property. Vehicle identification placards lost or misplaced may be replaced upon request of the contractor supervisor or the FMC employee in charge of the project.
5. Contractor vehicles may be inspected by plant guards or FMC supervision when entering or leaving the plant, or at anytime while on FMC plant property.



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SUPERSEDES: 52-8/81
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6. We normally do not permit personal owned vehicles to enter the plant. However, if you have an unusual circumstance requiring the use of a personal owned vehicle, contact the FMC employee in charge of your contract, who will complete the necessary arrangements.
7. All contractor identification badges and vehicle identification placards remain the property of FMC and must be returned to the plant gatehouse on the termination of the employee or on the termination of the contract.
8. General contractors will notify FMC personnel in advance of all sub-contractors who will be entering the plant. Notification will include specific dates and time sub-contractors will be in the plant.
9. FMC equipment or material is not to be removed from plant property without prior permission (including a material transfer) from authorized personnel. For information, contact the FMC employee in charge of your contract or the guard on duty at the gatehouse.
10. Each contractor and/or contractor personnel is responsible for the security of their personal tools. FMC in no way assumes responsibility for loss or theft of tools or equipment.
11. Contractors shall confine their employees and subs to the designated work areas only.
12. Intoxicants, controlled substances, firearms, ammunition, explosives, and cameras are not permitted on FMC plant property.
13. Reporting for duty under the influence of liquor or narcotics, physical violence, horseplay, committing and/or abetting theft is strictly prohibited and is cause for dismissal from plant property.
14. The slag pit area, located directly south of our furnace building, is considered a hazardous area. If you are working in the vicinity of these slag pits and you hear a warning siren activated, stop what you are doing and immediately go into a building until the siren stops. If you hear an explosion during that period of time, do not become alarmed and do not attempt to go to the scene of the explosion. Our furnace personnel are qualified to handle any slag pit explosions.
15. For "Pacemaker" patients, all areas where microwave ovens are located are posted as such. If applicable, the employee should ask about such locations.
16. Each contractor in charge of personnel working or using FMC-Pocatello Plant property or equipment is responsible to provide such personnel with proper personal protective equipment necessary to assure safe operation. If such personal protective equipment is borrowed from the company (FMC-Pocatello Plant), contractor representative in charge of borrowing such equipment must sign a receipt for such equipment. If such borrowed equipment is not returned in proper condition, the contractor shall be billed for cost of the item.



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SAFETY MANUAL

CONTRACTOR SAFETY GUIDELINES

NUMBER: 2.7.2
DATE OF ISSUE: 2-85
PREPARED BY: KBH
APPROVED BY: FHH
SUPERSEDES: 1-83
PAGE 3 OF 8

17. No FMC equipment other than that which you are qualified and authorized to operate may be operated by your personnel.

SAFETY

1. Complete first aid facilities for treating emergency cases are available at the plant dispensary or plant gatehouse. For continued redressing, it is suggested that a physician of your choice be consulted.
2. Immediately report any and all accidents involving your personnel or equipment. Such accidents shall be reported to the FMC employee in charge of your project or to the Safety Office. The prime product manufactured at this plant is elemental phosphorus which has a peculiarity of burning spontaneously when exposed to air. If you get phosphorus on your clothes or person, you must get water and wash it off immediately. Do not attempt to brush phosphorus from clothing with bare hands or otherwise.
3. All persons working at this plant are required to wear a nonmetallic hard hat and safety glasses. When working in areas where exposure to other possible hazards exist (dust, fumes, vapors, phosphorus, etc.), proper personal protective equipment must be worn. Gloves and long sleeve garments must be worn at all times when in the phosphorus exposure area. Under no circumstances is anyone allowed to work on FMC property while not wearing a shirt or while wearing only a body or undershirt.
4. Speed limit on plant property is 10 mph and must be adhered to. All stop and regulatory signs must also be adhered to.
5. No equipment will be operated without proper safety guards in place.
6. Contractors shall provide their padlocks and lockouts required and follow the plant Lockout/Tagout Procedure. In general, no work will be allowed on equipment until the equipment is secure and locks/tags have been placed on the main or branch breaker, disconnect, valve or other proper location. This will insure that such lines will not be energized nor equipment operated while work is being performed on the equipment. It is the responsibility of each individual concerned to be sure he is properly protected. Lockout/tagouts may be removed only by the individual who performed the original lock/tag. No FMC equipment may be shut down without prior approval of the FMC representative immediately prior to the shutdown. When necessary, a hazardous work permit will be issued and lock/tagging of the equipment shall be completed before work commences on any hazardous equipment.
7. Excavations and other hazardous areas, including areas under workmen, will be provided with shoring, warning signs, ropes, guard rails, or other adequate protection. If red colored concrete is encountered, it denotes encased electrical conduit and FMC employee in charge of the project should be notified before work continues.



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8. Only non-metallic ladders, equipped with safety feet properly placed and secured from falling or twisting, will be used.
9. Promptly report any defective equipment or unsafe conditions to the FMC employee in charge of your contract.
10. Smoking is not permitted anytime in areas posted with "NO SMOKING".
11. Specific instructions must be obtained from proper FMC personnel prior to working in close proximity to energized equipment.
12. Electricity, compressed air, steam, water, and gas may not be used without assuring that no persons are in position to be injured through use of such materials.
13. Gasoline, fuel oil, or carbon tetrachloride will not be used for cleaning.
14. Good housekeeping must be observed at all times; materials must be piled neatly and safely and all nails must be pulled from or bent down on scrap lumber. Oil on floors, platforms and stairs must be removed immediately or covered with an absorbent.
15. When working with or near other personnel, it is your responsibility to assure that the action of your employees does not result in injury to other personnel.
16. Fire fighting equipment will be used for fire fighting purposes only.
17. Personnel will not ride on any equipment except in a passenger seat or inside the bed or body of a truck equipped with sideboards. Riding on tail gates, fenders, bumpers, sitting on sideboards or trucks, or riding in buckets of front-end-loaders is strictly prohibited.
18. No person will ride on any hook, sling, or load being hoisted by material handling equipment. No person shall remain inside of or on a truck when it is being loaded by power equipment.
19. Practical jokes or horseplay is prohibited on company property.
20. Do not drink from hoses or regular water outlets at this plant. Drink only from fountains or faucets marked "Drinking Water".
21. All work shall be performed in compliance with Federal Occupational Safety and Health Act, Idaho minimum safety standards and practices for building and constructing industries (Idaho Code No. 2), Idaho minimum safety standards and permits for mining and mine industry (Idaho Safety Code No. 5), and other applicable state and local safety codes and regulations. If you are not familiar with these requirements,



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it is suggested that you contact the local office of the Occupational Safety and Health or Idaho State Department of Labor, and request copies of the regulations.

22. Safety hazards differ in various areas of the plant. The FMC employee in charge of your project will explain the hazards and safety precautions of your work area. Discussion should include, but not limited to, the following for respective plant areas:



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A. PHOSPHORUS AREA

- (1) Slag pit warning lights and metal tap siren.
- (2) Slag pit explosion.
- (3) Furnace energized and de-energized warning lights.
- (4) Safety showers.
- (5) Electrical hazards in connection with furnace transformers, precipitators, rectifiers, switchgear, and bus bar.
- (6) Phosphorus and phossey water lines.
- (7) Phosphorus sumps.
- (8) Carbon monoxide.
- (9) Phos dock safety tubs.
- (10) Possibility of phosphorus in any line or hose.

B. PREPARATION DEPARTMENT

- (1) Use respirators in areas posted "Respirators Required In This Area."
- (2) Phosphorus lines.
- (3) Phossey water lines.
- (4) Flare pit.
- (5) CO lines and possibility of CO gas.
- (6) Possibility of phosphine gas in Fluid Bed Dryer area.

C. SHALE AREA

- (1) Respirators required in shale crushing area.
- (2) If rotary dumper is in operation, do not enter operating area without prior permission of operator.
- (3) Observe all signs.
- (4) Car mover activities.
- (5) Heavy equipment activity, especially in shale reclaim area.
- (6) Conveyor safety (most can be started remotely).
- (7) Do not park on railroad tracks.
- (8) Microwave ovens.

D. OUTLYING AREAS

- (1) Slurry ponds.
- (2) Phossey water settling ponds.
- (3) All pump lines (may contain phos).
- (4) Slag haul equipment.
- (5) Walk in marked walkways where provided.



POCATELLO

SAFETY MANUAL

FORM NO. 75
CONTRACTOR SAFETY ORIENTATION

NUMBER: 2.7
DATE OF ISSUE: 1/8:
PREPARED BY: LJH
APPROVED BY:
SUPERSEDES: 52-
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CONTRACTOR SAFETY ORIENTATION

Name of Company (Contractor) _____

Description of Job _____

Location of Job _____

Name of Contractor Supervisor Receiving Orientation _____

The above named individual received safety orientation in accordance with FMC Pocatello Plant Safety Policy Number 52.

Signed (Contractor)

Date

Signed (FMC Rep.)

Date

Note: List any special safety problems or questions discussed.



POCATELLO

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FORM S100
INFORMATION FOR CONTRACTOR EMPLOYEES

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DATE OF ISSUE: 1/83
PREPARED BY: LJH
APPROVED BY:
SUPERSEDES: 52-8/8
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FMC - POCATELLO

INFORMATION FOR CONTRACTOR EMPLOYEES

The following are general rules for all contractor employees working on FMC Pocatello Plant property. For safety and security reasons, it is necessary that you fully comply with these rules along with all other rules or instructions issued by FMC management or your supervision.

1. Safety hats and safety glasses must be worn at ALL TIMES when on FMC property except in the lunchrooms, lavatories, and parking lot and must also be worn in these areas when you are working in these areas.
2. Gloves and long sleeve garments must be worn at all times when in the phosphorus exposure area. Your FMC contact will explain where these areas are.

Under no circumstances is anyone allowed to work on FMC property while not wearing a shirt or while wearing only a body or undershirt.
3. You will be issued an identification badge which, is to be shown to the guard on duty at the Gatehouse each time you enter plant property. You will be denied entrance unless your badge is shown. Upon termination of your work at this plant, the badge must be returned to your supervisor or to the FMC Gatehouse.
4. Designated parking areas have been assigned for parking of contractor employee vehicles. Park only in such designated areas.
5. FMC reserves the right to inspect all vehicles, packages, lunchboxes, etc., upon exiting FMC property. Such inspections will be conducted on a random basis.
6. Drinking water at this plant is obtained from a special chlorinated water system. Do not drink out of hoses or unmarked spigots. Drink only out of fountains marked drinking water.
7. The prime product manufactured at this plant is elemental phosphorus which has a peculiarity of igniting spontaneously when exposed to air.

If you get phosphorus on your clothes or person, you must get water and wash it off immediately.
8. A complete first aid dispensary is maintained on plant property. If you need emergency first aid, report to the plant dispensary or the main plant guard, both located in the plant changehouse at the east end of the main parking lot.

If you need the assistance of an ambulance crew, pick up the nearest telephone and dial 55.
9. The slag pit area, lying directly south of our furnace building, is considered a hazardous area. If you are working in the vicinity of these slag pits and you hear a warning siren activated, stop what you are doing and immediately go into a building until the siren stops. If you hear an explosion during that period of time, do not become alarmed or do not attempt to go to the scene of the explosion. Our furnace personnel are qualified to handle any slag pit explosions.
10. Due to the type of operations carried on at this plant, there is considerable heavy mobile equipment including railroad cars, front-end loaders, and large haul units. Be continuously on the lookout for such equipment and realize that the driver has blind spots and may not be able to see you. Therefore, always keep a safe distance from the equipment and give the equipment the right-of-way.
11. All company, plant, and federal safety regulations must be adhered to. You are responsible to work in a safe manner and to assure that your actions do not cause an injury to yourself, your fellow employees, or FMC employees.
12. Contractor personnel shall not use the FMC main lunchroom for their lunch and/or rest breaks. They may, however, use the lunchroom vending machines and telephone at times other than during lunch and rest break periods of FMC employees providing they have approval of their supervisor and do not remain there after completing their purchase or use of the telephone.

If you have any questions concerning safety, security, conditions, or regulations at this plant, immediately contact your supervisor.

I acknowledge having received, read, and understand the regulations listed on FMC form S100-1978 and agree to abide by each.

Signed

Dated

FORM S100-1978



POCATELLO
SAFETY MANUAL

ASBESTOS POLICY AND PROCEDURE

NUMBER: 2.9.15
DATE OF ISSUE: 1/89
PREPARED BY: ERH
APPROVED BY: FHH *FHH*
SUPERSEDES: 3/85
PAGE 1 OF 4

LONG-TERM GOAL

Our long-term goal is to eliminate all asbestos-containing materials from our plant. Until that goal is achieved, we will actively pursue analysis of materials suspected of containing asbestos and either remove these materials or permanently mark them as asbestos until they can be removed.

POLICY

It is the policy of the FMC plant to eliminate hazardous conditions where possible, and to minimize risks associated with hazardous conditions. This same policy will be followed in dealing with asbestos. All asbestos-containing material remaining in our plant will be removed in a manner that protects the health of our employees and complies with all federal regulations. All people involved in the asbestos removal operation will be properly trained on the hazards of asbestos and the proper procedures to be followed in working with asbestos-containing materials.

No asbestos-containing materials are to be installed in our plant with the exception of asbestos gaskets and packing, which are to be used only when no suitable substitutes are available. These materials will be treated when possible, and will be marked clearly, and recorded as hazardous material.

PROCEDURE

SCOPE

This procedure shall apply to all work involving materials which may contain asbestos. All insulating materials shall be examined to determine if asbestos is present prior to initiating work involving these materials. If it is not obvious that the material is non-asbestos, a sample of the material shall be analyzed to determine its asbestos content. No work shall be performed until this examination/analysis has been performed. This procedure shall apply to routine work as well as project work in all areas of our plant.

RESPONSIBILITY

Each business or support group will be responsible for insuring that adequate testing of insulation materials is conducted prior to initiating routine work, with the Safety Department responsible for conducting asbestos analyses and communicating the results of these analyses to the affected businesses. All people involved in the asbestos removal operation will be properly trained on the hazards of asbestos and the proper procedures to be followed in working with asbestos-containing materials. A plant asbestos removal team will assume these responsibilities and be periodically



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ASBESTOS POLICY AND PROCEDURE

NUMBER: 2.9.15
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PREPARED BY: ERH
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retrained to maintain their proficiency in asbestos regulations and removal techniques. All asbestos removal work will be performed according to the following ASBESTOS REMOVAL PROCEDURE.

ANNUAL POLICY REVIEW

As a result of these efforts, the amount of asbestos remaining in our plant, and the potential for exposure, will be constantly decreasing. In addition, federal regulations pertaining to asbestos will likely be changing. Therefore, this asbestos removal procedure, and our asbestos strategy, will be updated annually to reflect changing conditions and regulations.

ASBESTOS REMOVAL PROCEDURE

Removal of Asbestos Gaskets and Packing

When asbestos-containing gaskets and packing are removed, efforts should be made to reduce generation of dust by handling the material wet if possible. If it is not possible to prevent dust generation, an asbestos respirator is available in Stores. If there is a potential for asbestos fibers to accumulate on employee clothes, disposable clothing will be worn. Contact the Safety Department if you need assistance. Disposal of asbestos containing materials or asbestos contaminated clothing must be done in accordance with the section of this procedure entitled "Disposal of Asbestos Materials".

Removal of Asbestos Insulation

Prior to the removal of any material suspected of containing asbestos, an evaluation will be performed to positively determine if asbestos is present. If there are any questions concerning whether an insulation contains asbestos, a sample of the material should be submitted to a qualified asbestos laboratory for asbestos analysis. The Safety Department can provide assistance in this area if needed. If asbestos is present, a member of the Asbestos Removal Team (ART) shall be contacted prior to the start of work. This rule is to be followed without exception. If it is impossible to contact any of these individuals, contact the Safety Department or the Plant Guard. The ART has been formed to ensure that all asbestos is removed in a safe manner that is in full compliance with all governmental regulations. At the present time, this team consists of:

ELTON HEWITT
RALPH GRINNELL
TAYLOR GARDNER
JOHN HARRIS
DEAN BOLLINGER
J.P. LASLEY



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ASBESTOS POLICY AND PROCEDURE

NUMBER: 2.9.15
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APPROVED BY: FHH
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Once the Asbestos Removal Team has evaluated your situation, they will complete a Plant Asbestos Removal Report (attached) and advise you on the proper procedures for dealing with the asbestos. If removal is necessary, they will oversee all removal efforts. Disposal of asbestos containing materials or asbestos contaminated clothing must be done in accordance with the section of this procedure entitled "Disposal of Asbestos Materials".

If, for any reason, material suspected of containing asbestos is removed without following the above procedure, an investigation will be held as soon as the incident is discovered. A Plant Asbestos Removal Form will be filled out, and estimated asbestos exposure levels determined. Depending on the estimated asbestos exposure level, additional steps may be taken.

ASBESTOS REMOVAL PLAN.

Our long-term goal is to eliminate all asbestos-containing materials from our plant. On a short term basis, this will be accomplished as follows. Each project involving potential exposure to asbestos will be tested for the presence of asbestos. If asbestos is present, a decision will be made on the amount of asbestos to be removed as part of the project, and the necessary funds to accomplish the asbestos removal included in the project. If the decision is made to leave asbestos-containing materials in place, they will be permanently marked as to their asbestos content. This will be the responsibility of the Environmental Group, with assistance from the Safety Department.

On a longer term basis, an HPO task force will be formed (outlined in Pocatello Asbestos Strategy), and given the mission of determining the scope and extent of an asbestos inventory to be conducted of our plant. Once the scope of this inventory has been decided, and the time frame and personnel chosen, a detailed inventory of the asbestos remaining in our plant will be performed. Upon completion of the inventory, the Environmental Group will be responsible for implementing a removal plan. The removal efforts shall be jointly monitored by the Safety Department and Environmental Group to insure proper removal and disposal procedures are being followed. The actual removal of the asbestos materials will be performed by Maintenance, after receiving training from the Asbestos Removal Team. If the scope of the asbestos removal is deemed beyond the expertise of plant personnel, an outside contractor, with experience in working on asbestos removal projects, will be contacted to perform the work.



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ASBESTOS POLICY AND PROCEDURE

NUMBER: 2.9.15
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PREPARED BY: ERH
APPROVED BY: FHH
SUPERSEDES: 3/85
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PLANT ASBESTOS REMOVAL REPORT

Date: _____

Location: _____

Amount of Asbestos to be Removed: _____

Description of Suspected Asbestos to be Removed: _____

Has Material Been Analyzed: Yes No

If Yes, When: _____

Asbestos Removal Team

Member Coordinating Project: _____

List Procedures Being Used to Control Asbestos Emissions: _____

List Disposal Procedures Being Used: _____

Asbestos Respirators Used: Yes No

Personnel Handling Asbestos Trained: Yes No

Sampling Performed: Yes No Results: _____



POCATELLO

SAFETY MANUAL

REPORTING WORK CONNECTED INJURIES

NUMBER: 6.1
DATE OF ISSUE: 2/83
PREPARED BY: GFC
APPROVED BY: FHH-1/E
SUPERSEDES: 5
PAGE 1 OF 2

- I. All work injuries, no matter how minor, shall be reported as soon as practical. The procedure for reporting is as follows:
 - A. The employee should first try to report the injury to his foreman and request permission to report to the Dispensary or to the Guard in the Gatehouse for medical attention.
 - B. If the foreman is unavailable, the employee must be sure his job responsibilities are properly covered before reporting to the Dispensary or to the Guard on duty. He must report to his foreman as soon as possible after he has received medical attention.
 - C. Any employee injured at this plant and requiring medical attention after leaving the plant shall contact the Guard on duty for assistance in obtaining the proper medical attention.
- II. Upon treatment of an injured employee, the Plant Physician, Nurse or Guard shall immediately complete Part A of the Injury Report Form and:
 - A. If the employee is returning to the job, forward the pink copy of the Accident Report to the Safety Office, and give the white, blue, and yellow copies to the employee with instructions to immediately give the white and blue copies to his foreman, and keep the yellow copy for his own record.
 - B. If the employee is not returning to the job, give the yellow copy of the Accident Report to the employee and forward all other copies to the Safety Office for distribution.
 - C. If the employee is sent out of the Plant for treatment or sent home, the Plant Physician, Nurse, or Guard making the decision shall immediately contact the foreman or supervisor and advise him of the action. If the injury is obviously serious or will involve time loss after the day of the injury, the Plant Physician, Nurse, or Guard shall immediately notify the Safety Supervisor and the appropriate Area Supervisor.

FMC

POCATELLO

SAFETY MANUAL

FORM USED FOR REPORTING WORK CONNECTED INJURIES

NUMBER: 6.
DATE OF ISSUE: 2/
PREPARED BY: GF
APPROVED BY:
SUPERSEDES: 5
PAGE 2 OF

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SEE INSTRUCTIONS & FORMS, INC. - POCATELLO, IDAHO

FMC - POCATELLO INJURY REPORT

WHITE - FOREMAN
BLUE - FOREMAN
PINK - SAFETY OFFICE
YELLOW - EMPLOYEE
GREEN - DISPERARY

Class _____

Date and time of injury _____ Date and time reported _____

Injured's Name _____ Position _____ Clock No. _____

Supervisor _____ Department _____

Injured's statement _____

Nature of injury _____

Treatment _____

Disposition of injured: Back to work _____ Doctor _____ Hospital _____ Home _____

Restrictions _____

Signed _____ Date _____

FOREMAN'S OR SUPERVISOR'S INJURY INVESTIGATION

Date reported _____ Job class when injured _____

(Maint.) Was injured instructed? _____ (Prod.) Was injured qualified? _____

Was faulty equipment or unsafe condition involved? _____

Describe what occurred (in detail) _____

Witnesses: _____

Recommendations to prevent a recurrence _____

What action has been taken? _____

Foreman _____ Date _____ Supervisor _____ Date _____

Superintendent _____ Date _____

Safety Office: _____

Date Received _____ Received by _____

Comments: _____

NOTE: Before completing this form, review Plant Safety Manual instructions. Any questions concerning this form should be directed to Plant Safety Personnel.



POCATELLO

SAFETY MANUAL

INJURY NOTIFICATION AND FOLLOW-UP

NUMBER: 6.2
DATE OF ISSUE: 4/82
PREPARED BY: GFC
APPROVED BY: FHH-4
SUPERSEDES: 6b
PAGE 1 OF 2

PURPOSE

The purpose of an accident investigation is to determine the specific cause of an accident so that corrective action can be taken. The purpose of an accident investigation follow-up is to:

1. Maintain current knowledge of any employee injury/illness resulting from the accident.
2. Maintain knowledge of the current status of any recommendations resulting from the investigation, and to take whatever steps are necessary to prevent recurrence.

RESPONSIBILITIES

A. Employees

1. Employees are responsible to report all job related injuries/illnesses immediately. Such reports shall be made to their immediate supervisor, the Plant Nurse, or in the absence of the Plant Nurse, the Plant Guard on duty in the Gatehouse.
2. Any employee who is off work because of a work connected injury/illness and desires treatment other than by the Plant Nurse or the Plant Physician, shall consult the Plant Nurse or Plant Physician prior to obtaining treatment. If after hours, the employee must contact the guard on duty in the gatehouse, who will assist.
3. Any employee off work because of a work connected injury/illness must report to their foreman or supervisor and submit a release for duty slip signed by the Plant Nurse or the Plant Physician.

B. Foreman or Immediate Supervisor

1. To assure that any work connected injury/illness reported to them or of which they have knowledge, is immediately sent to the Plant Dispensary or to the Guard on duty in the gatehouse for proper care.
2. Upon notice of a work connected injury/illness, the foreman or immediate supervisor shall complete the FMC Plant Injury Report Form PS100, and forward a copy to the Safety Office, the Area Supervisor, the Department Head, and the General Superintendent before leaving the plant at the end of the work shift.



POCATELLO

SAFETY MANUAL

INJURY NOTIFICATION
AND FOLLOW-UP

NUMBER: 6.2
DATE OF ISSUE: 4/82
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SUPERSEDES: 6b
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3. To follow-up by contacting at least weekly any employee who is off work because of a work connected injury/illness. Records of such contacts shall be maintained and copies forwarded to the Safety Department.
4. To assure that any employee off work, because of a work connected injury/illness, is not permitted to return to work until they have been evaluated and authorized to do so by the Plant Nurse or Plant Physician. Such authorization shall be in writing.
5. Comply with all restrictions placed on employee by Medical personnel as a result of work connected injury/illness and assure that information concerning medical restrictions is passed on to any other Supervisor to whom the employee may be assigned.
6. If the injury is listed as a back sprain or strain, FMC Plant injury report form PS104 must also be completed and attached to FMC Plant injury report form PS100.

C. Department Head

The Department Head shall follow-up at least weekly to determine the status of recommendations submitted by the investigating committee, and shall take any action necessary to implement the recommendations.

D. Medical Department

The medical department will, when necessary, send the appropriate employer's First Report of Injury form to the applicable Workman's Compensation management firm, and to the Idaho Industrial Commission. This form can be used as the supplementary record for OSHA record keeping. If the form does not contain all of the information of OSHA 101, the missing information must be added.

E. Report Distribution

All work connected injuries/illnesses (use FMC Plant injury report form PS100 and PS104 when necessary) must be forwarded to:

- | | |
|--------------------|---------------------------------------|
| 2. Safety Office | c. Department Head |
| b. Area Supervisor | d. appropriate General Superintendent |

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS **HAZARDS, TOXICITY, FIRST AID AND MEDICAL TREATMENT**

The following information and recommendations are provided by Dr. A.J. Lebrun, Corporate Health Services Director, and supercede all previous documents on this subject. These procedures are intended for general application. Some local characteristics may justify minor deviation from the general procedures, however, judgment should be exercised. It is expected that possible deviations would be minor and not detract from the major aspects of these procedures. Corporate Health Services should be contacted for consultation and guidance in the application of these procedures:

I. HAZARDS

A. General

1. Phosphorus burns spontaneously when exposed to air and may cause severe burns. High concentrations of burning vapors are irritating to nose, throat and lungs. If combustion occurs in a confined space, oxygen is consumed and asphyxiation can occur.
2. If phosphorus is taken by mouth, it is absorbed from the gastrointestinal tract. It can also be absorbed by the lungs. Particles of white phosphorus imbedded deep in tissue and not in contact with air do not burn, but dissolve and are absorbed into body tissues and can produce systemic effects.
3. In industrial operations, the principal mode of exposure is from inhalation and the principal or most common injuries are from phosphorus burns on the skin.

II. ACUTE TOXICITY

A. Systemic Effects

1. The absorption of phosphorus when taken by mouth may be delayed as much as two (2) hours. After ingestion, there is an initial stage starting in a few hours with local gastrointestinal irritation shown by nausea, vomiting and severe abdominal pain. The vomitus may have a garlic-like odor and may be phosphorescent (luminous in the dark).

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS (continued)

2. After 24 to 36 hours, the symptoms are remittent. In a few hours, or in two or three days, nausea, vomiting and abdominal pain reappear with diarrhea and tenderness. The skin becomes yellowish in color. The condition progresses for 2 to 15 days, averaging 8 days.
3. Absorbed phosphorus can cause fatal damage to liver, kidneys or heart.

B. Local Effects

1. Phosphorus, when not surrounded by water, burns freely and will cause severe local tissue burns if it contacts the skin. Combustion of phosphorus on the skin results in the formation of meta- and ortho-phosphoric acids and small amounts of red phosphorus. These compounds are of no importance clinically, as the heat coagulation of the tissue is the important effect of phosphorus burns. A firm eschar (crust or scab) is produced and is surrounded by blisters.
2. Phosphorus is especially hazardous to the eye and produces severe damage.
3. Absorption of the phosphorus following severe or fatal surface burns in an amount sufficient to produce systemic toxicity has not been encountered to our knowledge.

III. FIRST AID AND MEDICAL TREATMENT

PRELIMINARY REMARK

The question of application of ice packs or cold water vs. room temperature water is of some current interest and dispute. Expert opinion at the present time is that cold water applications or immersion, or the application of ice packs, may be useful for a brief period, such as 15 minutes for instance, for the relief of pain in second-degree or partial thickness burns. Such treatment may also be useful in reducing the heat content of tissues with more severe burns if they are applied within 10 minutes of the time of burning. If the patient

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS (continued)

is first seen after that interval, the loss of heat by radiation to the environment or through the blood vessels supplying the burned area has been such that the temperature has been reduced to body temperature and the cold or ice soaks are of no specific benefit, since deep burns with coagulated nerves are characteristically not painful. Medical judgment should be exercised.

A. Phosphorus Surface Burns - General

1. All phosphorus burns must be put under water immediately. Wetting is accomplished by means of emergency safety showers, water hose outlets, water tubs and water taps at numerous locations in the plant work areas. All contaminated clothing, including underwear, is to be removed immediately while the patient is under the safety shower. Wrap the patient in clean, wet sheets and blankets and take him to the Dispensary, keeping blankets and sheets wet at all times.
2. Abundant washing is necessary to keep phosphorus from contact with air in order to prevent its burning.
3. Apply wet dressing on the wound during transport to the Dispensary or Hospital.

B. Minor Burns - First Aid

1. First Aid treatment for minor burns is to consist of applying saline or water simultaneously with ice or cold applications. This treatment is to be continued until all traces of phosphorus are gone. Applications of ice or cold water should not exceed 15-20 minutes, after which room temperature water may be used. Indeed, two factors must be kept in mind.
 - a. Cool or cold applications may help relieve pain; however, ice should never be applied directly to the injured area (it should be in an ice bag or wrapped in a towel) because further injury from cold can exacerbate the burn.
 - b. If the burn is extensive, 5-15% or more of body area, do not use cold compresses for more than 15 minutes to avoid the development of hypothermia.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS (continued)

2. Where the Dispensary is adequately equipped and trained personnel are available, after burning sensation has ceased, the burned areas may be cleaned with soap and water and all loose skin and phosphorus particles are removed to impede oxidation and to avoid secondary burns.

Place all particulate phosphorus removed from the wounds under water to prevent its reignition in the treatment or operating room.

3. Where only Dispensary in-plant treatment is necessary, following the cold applications, the burned area is dressed with a thinly impregnated vaseline gauze or with topical antimicrobial cream (Silvadene, for instance) and appropriate sterile dressing.
4. The patient should be instructed to return to the Dispensary daily for continued observation and treatment until the burn has properly healed.

C. Severe Major Burns

1. In the case of severe burns, Section III-A must be followed, and then the patient should be transported to the Dispensary by stretcher. A lying down position will help prevent or reduce shock. The patient is then to be transported to the hospital. He must be wrapped in sheets soaked with cold water or transported in a tank-type stretcher if available (see also "Preliminary Remark"). If at all possible, cold applications are to be continued during the transportation of the patient from the plant to the hospital. This can be accomplished by keeping the patient wrapped in wet sheets and applying ice packs. The ice packs should not, however, be applied for more than 15 minutes. Cold applications should be limited to patients with burns of less than 30% of total body surface with ambient temperature water used on other patients.
2. If the patient has to be transported a long distance and has burns of more than 30% of the total body surface, it is strongly recommended to initiate intravenous infusion of lactated Ringers solution to prevent the development of shock during the trip to the hospital.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS (continued)

D. Contact with Eyes

1. If even minute quantities of phosphorus, either in solid form or in solution, enter the eyes, they should be irrigated immediately with copious amounts of water for a minimum of 15 minutes. The eyelids should be held apart during the irrigation to assure contact of water with all tissues of the surface of the eyes and lids.
2. A physician, preferably an eye specialist, should be called in attendance immediately. If a physician is not immediately available, the eye irrigation should be continued for a second period of at least 15 minutes.
3. Irrigation of eyes should be continued until a physician is available. No oils or oily ointments should be instilled unless ordered by the physician.

E. Ingested - Taken Internally

1. If phosphorus is swallowed, either in solid form, as a paste, or as "phossy water," a physician should be called immediately. There is no established antidote.
2. Unless unconscious, the patient should be made to vomit at once. Vomiting can be induced by having the patient swallow large quantities of water. Syrup of Ipecac is available in bottles of one ounce without prescription; one or two tablespoons could be given along with water. If necessary, stick finger down the throat to cause vomiting. Repeated vomiting should be encouraged by giving large quantities of water.
3. Mineral oil, citrate of magnesia or milk of magnesia should be given after cessation of vomiting. Animal or vegetable fats or oils must not be given as these would increase the absorption of phosphorus. The injurious results of absorption may not occur for a matter of hours.
4. People who have ingested phosphorus should be referred to a physician without any delay.

SAFETY POLICIES AND STANDARDS

PHOSPHORUS POISONING AND BURNS (continued)

F. Inhalation

1. Inhalation of phosphorus vapor itself has not caused acute symptoms, but the employee should be immediately removed from the contaminated atmosphere to fresh air.
2. When phosphorus is burning, concentrations of the oxides of phosphorus are formed which are principally phosphorus pentoxide. The products of oxidation are a lung irritant. The patient should be removed to fresh air at once.
3. If the patient has respiratory distress or a persistent cough, 100 percent oxygen is indicated, provided it is available and that someone is present who is familiar with its administration. A physician should be called at once.
4. Burning of phosphorus in a confined area may cause a depletion of the oxygen from the air to a sufficient extent to cause asphyxiation. The patient should be removed at once to fresh air and effective artificial respiration initiated immediately if breathing has ceased. A physician should be called at once.

G. Hotline

Should, for some reason, a physician not be available for immediate consultation, emergency information might be available through the following:

An emergency hotline offering free consultations for doctors, nurses and other health workers who treat burn patients has opened round the clock at the University of Texas Health Service Center. Answered by trauma specialists, the phone number -- 214-688-3754 -- gives access to information on all aspects of acute or long-term care.

SECTION I, ATTACHMENT 2

APPENDIX B

**TASK-SPECIFIC SAMPLING AND ANALYSIS PLAN FOR
PHASE IV PONDS CLOSURE**

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Section 1

INTRODUCTION

This Sampling and Analysis Plan (SAP) addresses sampling activities required for closure of the Phase IV Ponds waste management unit (WMU 8) at FMC. All sampling activities will be performed in accordance with the task-specific Health and Safety Plan (Appendix A of this Closure Plan).

The objective of this plan is to specify the analytical methods to be used in the laboratory; detail the procedures that will be followed in the field to collect, store, and ship samples to the laboratory; define the chain-of-custody protocols; and describe the quality assurance program. This SAP is based on the Remedial Investigation/Feasibility Study (RI/FS) Sampling and Analysis Plan (see Section 5, References, of this appendix), which is more comprehensive and may be used for further details.

In-place closure of the Phase IV Ponds will require that equipment and piping associated with the ponds be removed and decontaminated by flushing the pipes with high-pressure water sprays, followed by a final rinse. Based on criteria specified in this Closure Plan, rinsate samples may need to be collected and analyzed for verification of decontamination. Groundwater samples will be obtained from monitoring wells in the vicinity of the ponds to monitor the water quality for selected constituents.

All samples will be collected and stored to prevent chemical or biological changes prior to analysis. A documented history will be kept of each sample in accordance with the National Enforcement Investigation Center (NEIC) Guidelines (EPA-300/78-001-R). This documentation will include information on the sampling source, dates of sampling and analysis, type of preservation, and chain of custody.

Section 2

ANALYTICAL METHODS

Based on knowledge of the waste deposited in the Phase IV Ponds, rinsate samples (if necessary) will be analyzed for RCRA Toxicity Characteristics Leaching Procedure (TCLP) metals as specified in Table B-1.

Groundwater samples from the monitoring wells will be collected during the post-closure period and analyzed for the parameters specified in Table B-2. These parameters are consistent with those specified in the existing FMC site-wide groundwater monitoring program (see Subsection 6.5 of this Closure Plan). If the parameters specified in that program are revised, this SAP will change accordingly.

Table B-1
ANALYTICAL PARAMETERS AND PROPOSED METHODS FOR
DECONTAMINATION RINSATE
FMC Facility, Pocatello, Idaho

RCRA Metals	Test Methods for Rinsate (1)
Arsenic	EPA 6010
Barium	EPA 6010
Cadmium	EPA 6010
Chromium	EPA 6010
Lead	EPA 6010
Mercury	EPA 3005/7470
Selenium	EPA 6010
Silver	EPA 6010

- (1) Analysis to be performed on TCLP extract in accordance with EPA SW-846 procedures.

Table B-2
PROPOSED ANALYTICAL PARAMETERS AND METHODS FOR
GROUNDWATER DETERMINATIONS
FMC Facility, Pocatello, Idaho

Inorganic Parameters	Method No.(1)	Method(2)
Arsenic	EPA 7061	HAA
Barium	EPA 6010	ICP
Cadmium	EPA 7131	GFAA
Chromium	EPA 7191	GFAA
Copper	EPA 6010	ICP
Iron	EPA 6010	ICP
Lead	EPA 7421	GFAA
Lithium	EPA 6010	ICP
Manganese	EPA 6010	ICP
Mercury	EPA 7470	CV
Selenium	EPA 7741	HAA
Silver	EPA 6010	ICP
Vanadium	EPA 6010	ICP
Zinc	EPA 6010	ICP

- (1) Methods cited are EPA SW-846 methods except for chloride, conductivity, nitrate, pH, and sulfate, which are based on "U.S. EPA Methods for Chemical Analysis of Water and Wastes," U.S. EPA-600/4-79-020, revised March 1983.
- (2) HAA = Hydride Atomic Adsorption Spectroscopy; CVAA = Cold Vapor Atomic Adsorption Spectroscopy; GFAA = Graphite Furnace Atomic Adsorption; ICP = Inductively Coupled Plasma Atomic Emission Spectroscopy.

Table B-2 (Cont'd)

Water Quality Parameters	Method No.(1)	Method
Alkalinity (bicarbonate)	EPA 310.1	Titrimetric
Alkalinity (carbonate)	EPA 310.1	Titrimetric
Ammonia	EPA 350.2	Colorimetric/Titrimetric
Calcium	EPA 6010	ICP
Chloride	EPA 325.3	Titrimetric
Conductivity	EPA 120.1	Conductivity meter
Dissolved oxygen	EPA 360.1	Membrane Electrode
Fluoride	EPA 340.2	Ion Selective Electrode
Magnesium	EPA 6010	ICP
Nitrate	EPA 353.3	Colorimetric
pH	EPA 150.1	Electrometric
Phosphorus (total)	EPA 365.3	Colorimetric
Phosphorus (orthophosphate)	EPA 365.3	Colorimetric
Potassium	EPA 6010	ICP
Sodium	EPA 6010	ICP
Sulfate	EPA 375.4	Turbidimetric
Temperature	EPA 170.1	Thermometric
Total dissolved solids	EPA 160.1	Gravimetric

- (1) Methods cited are EPA SW-846 methods except for chloride, conductivity, nitrate, pH, and sulfate, which are based on "U.S. EPA Methods for Chemical Analysis of Water and Wastes," U.S. EPA-600/4-79-020, 1986 (updated August 31, 1993).
- (2) HAA = Hydride Atomic Adsorption Spectroscopy; CVAA = Cold Vapor Atomic Adsorption Spectroscopy; GFAA = Graphite Furnace Atomic Adsorption; ICP = Inductively Coupled Plasma Atomic Emission Spectroscopy.

Section 3

SAMPLING PROGRAM

Special procedures will be followed for handling, shipping, and analysis of the samples for health and safety reasons should the samples contain elemental phosphorus, as discussed in Subsection 3.1. In addition, all possible precautions will be taken to prevent sample cross-contamination due to sampling techniques. Sampling activities will comply with the Health and Safety Plan of this Closure Plan (Appendix A).

3.1 Elemental Phosphorus Procedures

Special procedures for sampling, methods of analysis, and precautions for handling samples which may contain elemental phosphorus are contained in "Elemental Phosphorus Analyses by Microextraction and Capillary Gas Chromatography," Mountain States Analytical, May, 1993, which is attached to this appendix.

3.2 Sample Collection

Samples collected from the decontamination of equipment will consist of washwater or rinsate. Collection of soil from the pond areas is not planned. Groundwater samples will be collected from the monitoring wells, as addressed in Subsection 6.5 of this Closure Plan.

3.2.1 Rinsate Samples

Representative decontamination washwater and rinsate samples will be collected from the last round of flushing of materials/equipment. A portion of the last rinsate will be collected in a nonreactive container. The samples will be collected directly into the container by using a sampling pipette or a sampling container dipped into rinsate water. The container type is described in Subsection 3.3. These same procedures will be used for sampling the source of the washwater.

Decontamination washwater and rinsate will be disposed of on site, as described in this Closure Plan.

3.2.2 Groundwater Samples

Groundwater samples will be collected from the monitoring wells according to the sampling protocol described below. Analytical methods to be used are discussed in Section 2. The sampling frequency is addressed in Section 6.5 of this Closure Plan.

All measuring and sampling equipment will be decontaminated prior to its usage in a well as described in Subsection 3.4. Decontaminated equipment will be placed on new plastic sheeting until used. Water levels will be measured before purging.

Prior to sampling, wells will be purged using a bailer, an electric submersible pump, or an air-lift apparatus, depending on the diameter and capacity of the well. A minimum of three casing volumes will be removed from each well. If a well is pumped dry during purging, the well will be pumped dry twice, allowing 80 percent water level recovery between purges and prior to sampling. During purging, indicator parameters (i.e., pH, conductivity, and temperature) will be monitored to verify that the water to be sampled is representative of groundwater from the formation. Following purging, samples will be collected using a stainless steel or Teflon bailer or the discharge port of the air-lifting or pumping apparatus. The details of the sample collection procedure will be the same as those provided in Subsection 5.4 of the site RI/FS Sampling and Analysis Plan (see Section 5, References, of this appendix).

3.3 **Sample Handling**

The sample handling procedures described in this subsection address sample preservation and transport needed to maintain sample integrity.

3.3.1 Sample Containers and Preservation

Rinsate samples for metals analysis will be collected in nonreactive, 500 ml polyethylene bottles containing nitric acid preservative.

Groundwater and rinsate samples will be preserved by cooling the sample containers to 4°C using Blue Ice or ice. Holding time for samples for metals analysis is defined Tables B-3 and B-4.

Table B-3
SAMPLE PRESERVATION METHODS FOR
DECONTAMINATION RINSATE (1)
FMC Facility, Pocatello, Idaho

Analytical Parameters	Sample Containers	Sample Preservation	Holding Time
Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver	Polyethylene container	HNO ₃ to pH<2 Cool at 4°C	6 months (28 days for mercury)

(1) Reference: EPA SW-846 "Test Methods for Evaluating Solid Waste," 3rd Edition, 1986 (updated August 31, 1994); and EPA-600/4-79-020 "Methods for Chemical Analysis of Water and Wastes," Revised March 1983.

Table B-4
SAMPLE PRESERVATION METHODS FOR GROUNDWATER (1)
FMC Facility, Pocatello, Idaho

Parameters	Containers	Preservation	Holding Time
Alkalinity (bicarbonate)	Polyethylene	Cool to 4°C	14 days
Alkalinity (carbonate)	Polyethylene	Cool to 4°C	14 days
Ammonia	Polyethylene	H ₂ SO ₄ to pH<2; Cool to 4°C	28 days
Calcium, magnesium, potassium, sodium	Polyethylene	HNO ₃ to pH<2; Cool to 4°C	6 months
Chloride	Polyethylene	None required	28 days
Conductivity	Polyethylene	Cool to 4°C	28 days
Dissolved oxygen	Polyethylene	None required	Analyze immediately
Fluoride	Polyethylene	None required	28 days
Mercury	Polyethylene	HNO ₃ to pH<2; Cool to 4°C	28 days
Metals (2)	Polyethylene	HNO ₃ to pH<2; Cool to 4°C	6 months
Nitrate	Polyethylene	Cool to 4°C	48 hours
Orthophosphate (PO ₄ as P)	Polyethylene	Filter immediately; Cool to 4°C	48 hours
pH	Polyethylene	None required	Analyze immediately
Phosphorus, total	Polyethylene	H ₂ SO ₄ to pH<2; Cool to 4°C	28 days
Sulfate	Polyethylene	Cool to 4°C	28 days
Temperature	Polyethylene	None required	Analyze immediately
Total dissolved solids	Polyethylene	Cool to 4°C	7 days

- (1) Reference: EPA SW-846 "Test Methods for Evaluating Solid Waste," 3rd Edition, 1986 (updated August 31, 1994); and EPA-600/4-79-020 "Methods for Chemical Analysis of Water and Wastes," Revised March 1983.
- (2) The specific metals to be analyzed are listed in Table B-2.

For groundwater samples, a 1-liter polyethylene bottle containing nitric acid preservative will be needed for metals analysis, and one 500-ml unpreserved polyethylene container will be needed for fluoride, pH, and orthophosphate analysis. One 500-ml polyethylene container with sulfuric acid preservative will be required for total phosphorus analysis. If multiple laboratories are used for these analyses, an equal number of containers described above per laboratory will be required. Groundwater samples will be preserved with nitric acid or sulfuric acid and cooled to 4°C, as indicated in Table B-4.

3.3.2 Shipping Requirements and Holding Times

Samples will be packaged for shipment as follows:

- Attach sample label to each container.
- Secure caps on all containers with signed and dated custody seals; wrap glass jars in ziplock bag or place in bubble wrap bag.
- Store in an ice chest immediately after sample collection.
- Ship samples to the laboratory in a sealed ice chest with chain-of-custody documents.
- Affix signed and dated custody seals to coolers.
- Ship samples via air courier following all Department of Transportation requirements.

Samples will be shipped to an off-site laboratory and will be kept at a temperature of 4°C or lower from the time of collection through the arrival of the samples to the laboratory. The laboratory will store the samples at 4°C until all the analyses have been completed. Samples will be analyzed within the EPA holding times as defined in Tables B-3 and B-4.

3.4 **Equipment Decontamination**

Decontamination of sampling equipment must be consistently conducted so as to assure quality of the samples collected. The resulting decontamination fluids and residual material must be properly handled so as to avoid recontamination.

All sampling equipment that comes into contact with potentially contaminated soil or water will be decontaminated. Decontamination will consist of steam-cleaning equipment prior to and after each use. Trowels, samplers, and brass tubes will be steam cleaned or washed with a nonphosphate detergent scrub, followed by fresh water, and deionized water rinses. Equipment will be decontaminated on pallets or plastic sheeting, and clean equipment will be stored on plastic sheeting in uncontaminated areas. Materials to be stored more than a few hours will be covered.

3.5 Management of Sampling and Decontamination Residuals

Decontamination fluids and residuals will be containerized, if necessary, and disposed of as described in Subsection 4.4 of this Closure Plan.

Section 4

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The Quality Assurance Project Plan (QAPP) that will be followed during all phases of the project to assure the accuracy and reliability of the results is provided in the RI/FS Sampling and Analysis Plan (see Section 5, References, of this appendix).

The overall data quality objective of the SAP is to obtain data of sufficient quantity and quality to support data requirements identified in the Phase IV Ponds Closure Plan.

A summary of both the sampling and analytical quality control (QC) practices and the documentation requirements for closure of the Phase IV Ponds are presented below.

4.1 Sampling Procedures

All samples will be handled in accordance with EPA Chain-of-Custody Guidelines during collection, transfer, analysis, and disposal. Chain-of-Custody Forms will be properly completed and sent to the analytical laboratory with the samples. The Chain-of-Custody Record will include project number and name, sample number, date, time, station location, composite or grab sample, sample matrix, test method, preservative added, identification and signatures of the sampler, and sample receiver.

After proper packaging for shipment, a signed and dated chain-of-custody seal will be placed around the openings of the package to prevent tampering.

4.2 QC Checks

Both field and laboratory quality control checks will be conducted to evaluate field contamination, variability of field techniques, and the performance of laboratory analytical procedures. QC checks of samples introduced into the analytical program will ensure analytical accuracy and precision.

4.2.1 Field QC Checks

One duplicate will be collected from each matrix sampled. The duplicate will be submitted to the laboratory for analysis for each batch of samples collected or one duplicate per 20 samples, whichever is more frequent. The duplicate will be analyzed for the same parameters as the sample that is duplicated.

4.2.2 Laboratory QC Checks

Laboratory personnel will be responsible for the care and the custody of samples from the time of their receipt at the laboratory through their disposal. The laboratory performing the analyses will have an established QA/QC plan and all analyses will be performed in accordance with the plan and appropriate analytical method guidelines. Because phosphorus may be present in the samples, special handling procedures will be required by the laboratory. Since phosphorus oxidizes on contact with air, health and safety precautions will take precedence over approved methodologies, which would result in the phosphorus being exposed to air. Standard analytical chemistry techniques and procedures will be followed.

As part of the internal QC checks, the laboratory will be responsible for the following:

- Calibration of instruments as described in and at the frequency prescribed in the analytical methods to be used and in the instrument manufacturers' instructions.
- Analysis of standards for each analytical method to be performed at the start of each laboratory shift.
- Analysis of one laboratory travel blank by each analytical method for every 20 samples analyzed, or one per batch, whichever is greater.
- Calculations performed by the laboratory for reporting chemical concentrations will be performed according to the procedures specified in the relevant methods of analysis listed in Tables B-1 and B-2.
- Sample containers, preservatives, and holding times will be as specified in the preceding sections.

- Analysis of one matrix spike sample for every 20 samples analyzed, or one per batch, whichever is greater; matrix spike samples will be spiked with representative compounds for each analytical method performed.

Section 5

REFERENCES

Sampling and Analysis Plan for Remedial Investigation/Feasibility Study, Eastern Michaud Flats Site, Idaho, for FMC Corporation, by Bechtel Environmental, Inc., February 1992.

ATTACHMENT TO APPENDIX B

**ELEMENTAL PHOSPHORUS ANALYSES BY MICROEXTRACTION AND
CAPILLARY GAS CHROMATOGRAPHY**

**Elemental Phosphorus Analyses by
Microextraction and Capillary Gas
Chromatography**

A Status Report

Submitted to

**Pamela S. French
FMC Corporation
Phosphorus Chemical Division
Pocatello, ID**

Prepared by

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May 1993

Introduction

Few analytical methods exist for the detection and quantitation of elemental phosphorus at low levels. At the request of FMC, Mountain States Analytical, Inc. (MSAI) has performed a detailed study to develop and validate a reliable, accurate method for the determination of elemental phosphorus (P_4) by capillary column gas chromatography (GC) using a selective nitrogen/phosphorus detector (NPD). The P_4 method described in this report was developed with the assistance of FMC's chemistry staff and is based on a similar packed column GC method used by FMC for the past several years. A copy of the FMC method is attached to this report as Appendix A. The capillary GC/NPD method developed by MSAI is capable of detecting P_4 contamination in ground water and soil matrices in the low parts-per-billion (ppb) concentration range.

Experimental

Standards Preparation. The elemental phosphorus used for the calibration standards was purchased from Aldrich Chemicals (Catalog # 30,255-4; Phosphorus, stick yellow, 99+ % purity, in water). Small pieces cut under water were rinsed with toluene and placed in toluene (Fisher Scientific, Optima Solvent) in a tared 1000 milliliter (ml) volumetric flask. 3.0 grams (g) of phosphorus was dissolved in a small amount of solvent and the flask brought to volume with toluene. The final concentration of this stock solution was 3000 milligrams/liter (mg/l) and was labeled Phosphorus Stock Solution. The stock solution was diluted to obtain four calibration solutions at the following concentration levels: 0.015 mg/l, 0.150 mg/l, 1.50 mg/l, and 15.0 mg/l.

An elemental P_4 spiking solution was prepared at 450 mg/l in methanol (Burdick and Jackson, purge and trap grade). This solution was then used to spike aqueous samples analyzed in these experiments.

Standards prepared by FMC were also used as a second source check on MSAI solutions. These samples were prepared by FMC chemists and transported (at 4°C) to MSAI by courier.

Instrument Set-up. This initial study for analysis of P_4 in xylene and toluene extracts was performed on a leased (U.S. Analytical, San Carlos, CA) Hewlett-Packard (HP) 5890 Series II GC-NPD with a 7673 autosampler and split/splitless injector. An HP ChemStation data system was used for collection and processing of qualitative and quantitative data. The GC was equipped with a 5 meter (m) x 0.53 millimeter (mm) internal diameter HP-1 fused silica capillary column (2.65 micron film thickness). After several trial runs using the P_4 standards in toluene, the following conditions were established:

Injection Volume:	2 μ l
Initial Temperature:	50°C
Initial Time:	1.0 min
Oven Program:	Ramp to 80°C at 6.0°C/min (No Hold) Ramp to 180°C at 20.0°C/min (Hold 3 min)
Injector Temperature:	200°C
Detector Temperature:	250°C

In addition to the NPD, an HP 5970 mass selective detector (MSD) coupled to an HP 5890 GC was used to obtain mass spectral identification of P_4 in a toluene solution. An HP 1000 computer data system with RTE software (Rev. F) was used to collect, store, and process the mass spectral data. The capillary column used in this system was a 30 m x 0.25mm i.d. RTx-5 (Restek, Bellefonte, PA).

Calibration. A four point calibration curve based on peak area counts, over a concentration range from 0.015 mg/l to 15.0 mg/l was used. Due to the instability of the NPD, calibration curves were established daily. Quantitation of P_4 in the samples analyzed for this study was achieved using a point-to-point calibration technique (i.e., the two nearest calibration points were used to calculate the sample concentration using a straight line formula). This quantitation method is a standard procedure provided by the HP ChemStation software used with the GC for these experiments.

Sample Extraction. Two different sample preparation procedures were used in this work. The first was a liquid/liquid extraction technique performed using separatory funnel procedure. The basic procedure used by FMC (see Appendix A) was used with minor modifications. The primary difference was the use of toluene in place of xylene as the P_4 extracting solution. Toluene (Fisher Scientific, Optima Solvent) was used because of its higher purity compared to xylene. In addition, the phase separation filtration step described in the FMC procedure was not performed.

A microextraction procedure was developed by MSAI to facilitate handling and to insure immediate extraction of aqueous samples collected in the field. A copy of the procedure used by the field samplers is shown in Appendix B. Briefly, 2.0 ml of toluene was measured into a 40 ml volatile organic analysis (VOA), precleaned-Type 1 vial (ESS, Oakland, CA) and shipped to the field. The samplers were instructed to fill the VOA vial to the bottom of the neck (see diagram in Appendix B) with sample (approximately 37 ml \pm 0.35%), replace the cap, and vigorously shake the water/toluene solution for 30 to 60 seconds. The sample vials were

collected in duplicate for each location, packaged in a cooler with blue ice at 4 °C, and delivered to the laboratory by express courier service. This same procedure was used by MSAI chemists in preparing solutions for comparison of the separatory funnel and microextraction procedures.

Results and Discussion

Several sets of experiments were performed to validate the GC/NPD method for the analysis of P_4 in aqueous and soil samples. First, an appropriate calibration procedure was investigated. Additionally, GC/MS was used to confirm that elemental P_4 was indeed the compound eluting from the capillary column using the developed GC method. A series of standards and sample extracts prepared by FMC and MSAI was also exchanged to validate the performance of the two laboratories and their procedures and instrumental measurements. Next, a comparison study of the separatory funnel and microextraction sample preparation procedures was conducted. These experiments included a stability study of P_4 in the microextraction vials to determine the degradation rate and an acceptable holding time. Finally, this study culminated with analysis of a set of ground water samples collected from the FMC elemental phosphorus plant in Pocatello, ID.

Calibration Studies. The excellent signal to noise ratio obtained by this capillary GC/NPD method is observed in the chromatogram shown in Figure 1 from the analysis of the 0.015 mg/l calibration solution.

A P_4 calibration table using data collected early in the method development phase is shown in Table 1. The P_4 calibration is reasonably linear using the three lower concentrations, but the linearity deteriorates when the highest calibration level is considered. This phenomenon

Table 1. Calibration Table for P_4 Analyses (23 June 92).

Level	Concentration (mg/l)	Response Factor
1	0.015	2.54e-007
2	0.15	2.83e-007
3	1.5	4.11e-007
4	15.0	9.76e-007
Notes: (1) Cal Levels 1-3: Mean = 3.16e-007; Std Dev = 0.68e-007; RSD = 21.6 %		
(2) Cal Levels 1-4: Mean = 4.81e-007; Std Dev = 2.92e-007; RSD = 61 %		

is probably due to detector overloading and the lower linearity range of the NPD (10^4) compared to other GC detectors, such as the flame ionization detector (10^7).

The linear regression calculation for all four calibration levels results in an R^2 value of 0.987514. If only the three lowest concentration levels are used, then the R^2 value increases to 0.991530. These observations indicate that a calibration range of 0.010 to 1.0 mg/l may provide more acceptable linearity compared to EPA's Contract Laboratory Program (CLP) requirements, which recommend an R^2 value of > 0.995 to quantify organic compounds.

If the procedures prescribed in Section 7.4 of Method 8000, SW-846 (Test Methods for Evaluating Solid Wastes) are considered, either a calibration curve or an average response factor quantitation approach may be selected. As noted in Table 1, the average (mean) response factor (R_f) for the first three calibration levels has a relative standard deviation (RSD) of 21.6%, only

slightly higher than the 20% window allowed by Method 8000. Setting the calibration range from 0.010 to 1.0 mg/l as suggested above could result in meeting the 20% criteria of Method 8000. Because the RSD of the average R_f was greater than 20%, the calibration curve method described in the experimental section was used to quantify P_4 in the samples analyzed in these studies.

Calibration curves obtained subsequent to the early measurements reported in Table 1 have shown average R_f values for multiple point calibration curves with RSD values less than 20% and R^2 values greater than 0.995. For example, a four point calibration curve (0.015 to 15.0 mg/l) performed on 09/03/92 had an average R_f with an RSD of 9.7% and an R^2 value of 0.999930. These data suggest that acceptable linearity can be achieved using this GC/NPD method to provide valid quantitation of P_4 in toluene sample extracts.

GC/MS Confirmation. GC/MS was used to establish that the peak eluting from the capillary column was elemental phosphorus and not an oxide or solvent-derived by-product. The 15 mg/l P_4 standard in toluene was analyzed according to the conditions described in the experimental section. The relevant portion of the chromatogram from this analysis is shown in Figure 2. P_4 eluted at 12.5 minutes and was very symmetrical with no peak tailing, even with the 30 meter column used for GC/MS experiment. The mass spectrum shows the molecular ion or parent ion for the P_4 at 124 atomic mass units (amu). The 124 amu peak is also the base peak for this elemental compound. Fragment ions representing P_3 (93 amu), P_2 (62 amu) and P_1 (31 amu) were also observed due to the ionization voltage of the mass spectrometer (electron impact mode; approximately 70 eV). Higher mass fragments indicative of P_4 oxides, complexes, or

reaction products were not observed. This data confirms that P_4 survives the chromatography conditions used in this GC method and is the elemental compound being quantified.

Comparison Studies. Several sets of P_4 standard solutions and blanks were exchanged between FMC and MSAI's laboratories to correlate and validate both the qualitative and quantitative aspects of the GC/NPD method. First, P_4 quality control samples (blanks and calibration standards) prepared and used by FMC were analyzed by MSAI to verify method development and calibration. All FMC xylene blanks had P_4 levels below the limit of quantitation (BLOQ) when analyzed by MSAI. An FMC calibration standard at a concentration of 0.115 mg/l gave a 104% recovery versus MSAI's calibration. Likewise, a 1.15 mg/l calibration standard gave a 97.4% recovery. In a second round of verification experiments, MSAI's calibration standards for all four levels (0.015 to 15.0 mg/l) were analyzed by FMC's laboratory under their GC conditions for comparison and as a bias check. Results from this comparison experiment are shown in Table 2; raw data as submitted to MSAI is found in Appendix C. FMC quantified

Table 2: FMC's Analysis of MSAI's Calibration Standards

MSAI Calibration Standard (mg/l)	FMC Value (mg/l)	Difference (%)
15.0	16.74	112
1.50	2.01	134
0.150	0.19	127
0.015	0.021	140
Blank	BLOQ	NA

each standard by bracketing the concentration of the MSAI calibration standard with their own calibration standards (see Appendix C). Although biased somewhat high, agreement appears to be within an acceptable range.

Extraction Method Comparison. A series of experiments was performed to demonstrate the acceptability of using both the separatory funnel and microextraction liquid/liquid extraction procedures for sample preparation. First, these two sample preparation procedures were compared by MSAI chemists. A P₄ methanol spike solution was used to prepare three spiked aqueous samples of increasing P₄ concentration that were subsequently extracted by both procedures. This protocol was performed in duplicate. The results from this comparison experiment are shown in Table 3.

Table 3. Comparison of Separatory Funnel and Microextraction Procedures.

		Concentration (mg/l)	Spike Recovery (%)	Duplicate RPD (%)
Separatory Funnel				
High	9.0 mg/l	12.6	140	0.91
Mid	0.45 mg/l	0.263	58.4	1.5
Low	0.045 mg/l	0.0183	40.7	7.9
Microextraction				
High	9.0 mg/l	11.1	124	0.79
Mid	0.45 mg/l	0.186	41.3	4.7
Low	0.045 mg/l	0.0172	38.2	9.8

Data from this comparison experiment suggest a strong correlation between the microextraction and separatory funnel liquid/liquid extraction sample preparation procedures. The results obtained from extracting the spiked aqueous sample by each method agreed well at each concentration level. It is interesting to note, however, that the extraction efficiency significantly decreases at the two concentration levels below 1.0 mg/l for both techniques. Further experimentation at concentrations less than 1.0 mg/l is required to elucidate and confirm this observation.

Next, the microextraction and separatory funnel liquid/liquid extraction procedures were compared with actual samples. For this experiment, FMC collected two aliquots of two different Slag Pit water samples containing both dissolved and microparticulate solid P_4 . The first aliquot was collected, diluted (5 ml to 500 ml), and extracted (400 ml) by FMC's procedure at their laboratory. The P_4 concentration was determined by FMC using their GC/NPD method. These sample extracts were then transferred to MSAI for determination of the P_4 concentration by the developed capillary GC/NPD method. The second aliquot was collected (37 ml sample) in a microextraction VOA vial containing toluene (2 ml) according to the instructions in Appendix B. Duplicate VOA vials were collected for each sample. These samples were transferred to MSAI for P_4 analyses. The results of this set of experiments are provided in Table 4.

According to FMC's data, Sample #1 and Sample #2 contained approximately 100 mg/l elemental phosphorus. Concentration data for Sample #1 prepared by each method agree within 5% if MSAI's separatory funnel and microextraction values are compared, and within 16% if FMC's separatory funnel and MSAI's microextraction results are compared. Comparison of Sample #2 data in the same manner results in agreement of 46% and 20%, respectively.

Table 4. Comparison of Extraction Procedures for Two Field Samples.

Sample Description	P ₄ Concentration (mg/l)		% Difference
	FMC Value	MSAI Value	
Separatory Funnel/Sample #1	93.0	103	111
Separatory Funnel/Sample #2	118	97.1	82.3
Microextraction/Sample #1	NA	108	NA
Microextraction/Sample #2	NA	142	NA
Note: Duplicates for microextraction of Samples #1 and #2 had RPD values of 2.4% and 4.5%, respectively.			

Interestingly, FMC's separatory funnel and MSAI's values have better agreement than MSAI's values for the two techniques. A possible source of error for the MSAI measurements was the fact that quantitation was reported outside the calibration window (i.e. above the high calibration standard of 15.0 mg/l). Although the curve was extremely linear ($R_2 = 0.999930$), better accuracy may have been obtained if quantitation had been performed within the calibration range. Nonetheless, these data indicate a reasonable level of agreement and support the use of the microextraction technique as a preparation method for aqueous samples.

P₄ Stability Study. The microextraction technique developed by MSAI requires storage (4°C) of the toluene extract in a 40 ml vial in the presence of the aqueous sample for an extended period. Due to this factor, it is essential to determine if P₄ is stable under these storage conditions. An experiment was performed in which a low concentration of P₄ was spiked into several 40 ml VOA vials containing 37 ml of deionized water and 2.0 ml of toluene. An adequate quantity of vials was spiked, shaken, and stored so that triplicate P₄ analyses could be

performed at regular intervals over approximately a one month period. The Day 0 sample was extracted immediately after preparation, analyzed by the GC/NPD method in triplicate, and the average used as 100% recovery. Initially, triplicates were analyzed daily, but as the study continued the analysis frequency was decreased from daily to every 2-7 days. The results from this stability study are summarized in Table 5 and shown graphically in Figure 3.

Table 5: Phosphorus Stability Study Data

Day	Sample Volume (ml)	Solvent Volume (ml)	Instrument Concentration (mg/l)	P ₄ Concentration (mg/l)	P ₄ Remaining (%)
0	37	2	0.138	0.00746	100.0
1	37	2	0.132	0.00714	95.7
2	37	2	0.133	0.00719	96.4
3	37	2	0.130	0.00703	94.2
6	37	2	0.133	0.00719	96.4
8	37	2	0.132	0.00714	95.7
10	37	2	0.134	0.00724	97.1
13	37	2	0.132	0.00714	95.7
22	37	2	0.131	0.00708	94.9
24	37	2	0.128	0.00692	92.8
28	37	2	0.132	0.00714	95.7

The results indicate a drop of about 5% in the first 24 hours, followed by a very gradual decrease of 3-4% over the next 27 days. The spiked concentration in the water sample was relatively low at about 0.0075 mg/l. Some variations in the day-to-day results should be expected due to the low concentration of P₄ in the samples and the large number of spiked

samples required for this study. However, the plot in Figure 3 shows a very acceptable overall reproducibility. These results demonstrate the validity of a 28 day holding time for aqueous samples containing elemental phosphorus using the microextraction technique.

Ground Water Samples. A set of eight ground water samples from FMC's elemental phosphorus plant (Pocatello, ID) was collected and extracted using the separatory funnel liquid/liquid extraction technique and analyzed for P_4 using the GC/NPD method. FMC completed the extractions and both FMC and MSAI performed the GC/NPD analyses. Samples were collected and extracted by FMC on June 18, 1992. MSAI received the sample extracts on June 19, 1992 and analyzed them on June 25, 1992. Elemental phosphorus data for these ground water samples are summarized in Table 6. Table 7 provides results for the quality control samples submitted by FMC with the ground water samples. Finally, copies of the chain of custody forms and MSAI's analysis log are attached in Appendix D.

All eight ground water sample extracts were found to have P_4 concentrations less than the limit of quantitation (0.001 mg/l). However, Sample #9206-219 had a P_4 concentration of 0.017 mg/l, just above the low standard of 0.015 mg/l. A duplicate vial for Sample #9206-221 was prepared and analyzed as batch QC. The RPD based on peak area counts for these duplicate analyses was only 5.63%, even though the area counts were below the limit of quantitation. An FMC check standard at 1.15 mg/l was analyzed as a calibration check just prior to analyzing the ground water sample. The percent recovery for the check standard was 105%. All toluene and xylene solvent blanks analyzed during the sequence showed no detectable P_4 contamination or carry-over in the system.

Table 6. Ground Water Sample Results.

MSAI Lab Number	Sample Description	Instrument Concentration (mg/l)	MSAI Sample Concentration (mg/l)	FMC Sample Concentration (mg/l)
28472	GW-9206-219	0.017	<0.001	<0.001
28473	GW-9206-220	<0.015	<0.001	<0.001
28474	GW-9206-223	<0.015	<0.001	<0.001
28475	GW-9206-221	<0.015	<0.001	<0.001
28476	GW-9206-224	<0.015	<0.001	<0.001
28477	GW-9206-225	<0.015	<0.001	<0.001
28478	GW-9206-226	<0.015	<0.001	<0.001
28479	GW-9206-227	<0.015	<0.001	No Data

Table 7. Ground Water Quality Control Samples.

MSAI Lab Number	Sample Description	Instrument Concentration (mg/l)	MSAI Sample Concentration (mg/l)	FMC Sample Concentration (mg/l)
QC Standard	10-FMC	0.243	NA	0.248
QC Standard	11-FMC	1.35	NA	2.067
QC Sample	12-1A Xylene Extract	13.5	no data	250
QC Sample	13-4A Xylene Extract	23.3	no data	16

The agreement on the 0.248 mg/l FMC standard (Sample #11, Table 7) was excellent with the FMC value slightly higher than MSAI's reported value. Poorer agreement for the 2.067 mg/l sample was observed, with the MSAI reported value only 65.3% of FMC's declared true value. The last two samples (#12-1A and #13-4A) were blind samples submitted by FMC.

After completion of these analyses, FMC reported P_4 concentrations for the 12-1A xylene extract of 250 mg/l and 16 mg/l for the 13-4A xylene extract. To date, FMC has not provided calculation information so that the P_4 concentrations in these two xylene extracts can be compared.

Summary

This report summarizes the development work performed at MSAI in order to provide independent analytical capability for analyzing P_4 contamination in aqueous and soil samples by microextraction and GC/NPD. Standards preparation and calibration procedures are in place that comply with EPA SW-846 method requirements. The application of capillary columns to the analysis of P_4 by GC/NPD have resulted in lower detection limits and better resolution compared to similar packed column techniques. Reproducible detection limits for aqueous extracts of 0.0005 mg/l, or better, should be obtainable with this method.

MSAI has also developed a liquid/liquid microextraction sample preparation method for collecting ground water samples that greatly simplifies field handling, provides immediate extraction of elemental phosphorus upon sampling, and facilitates transport and storage. The studies presented in this report document that the microextraction procedure provides comparable result to the separatory funnel technique. In addition, the stability of P_4 in the microextraction vial has been shown to be at least 28 days.

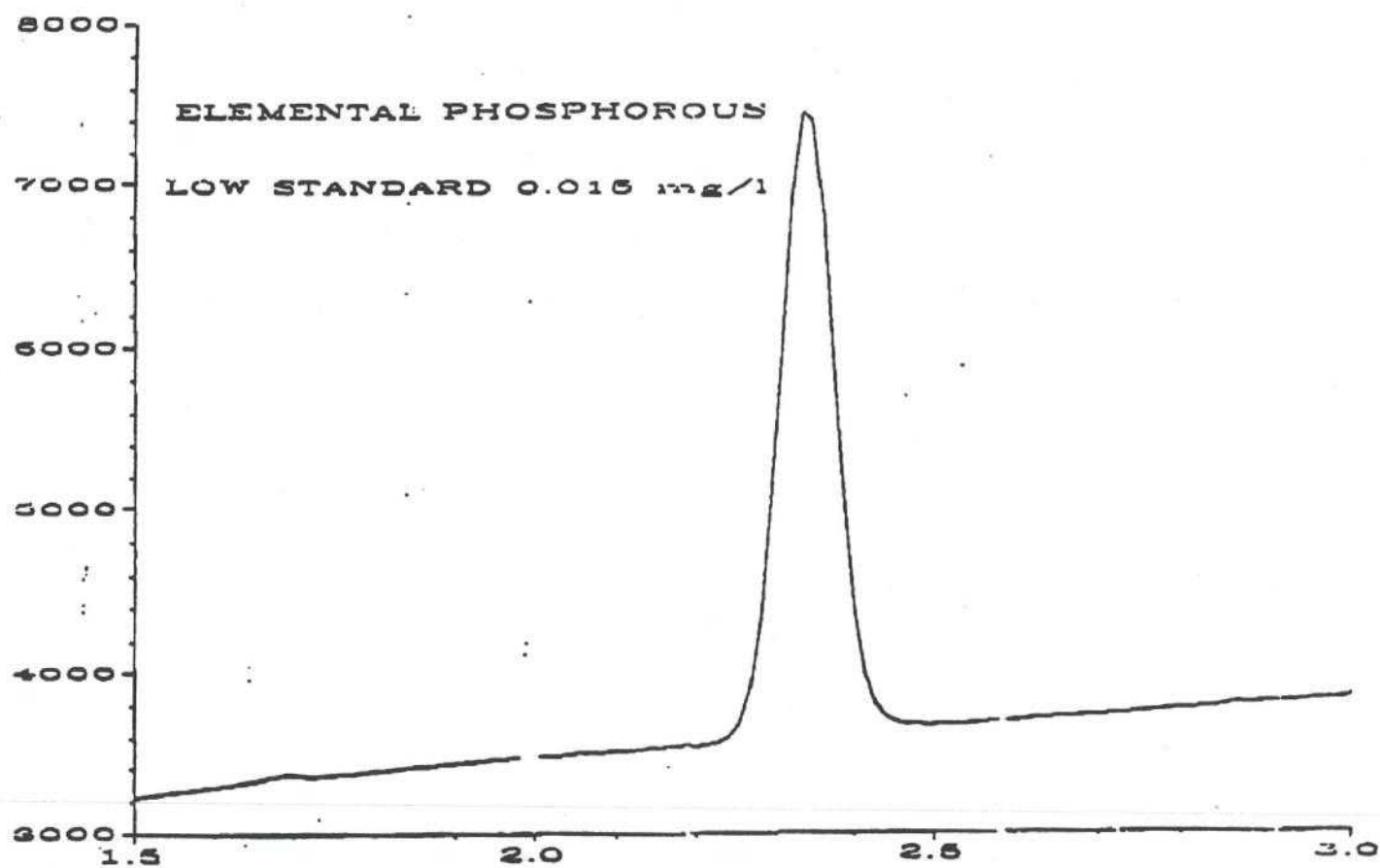
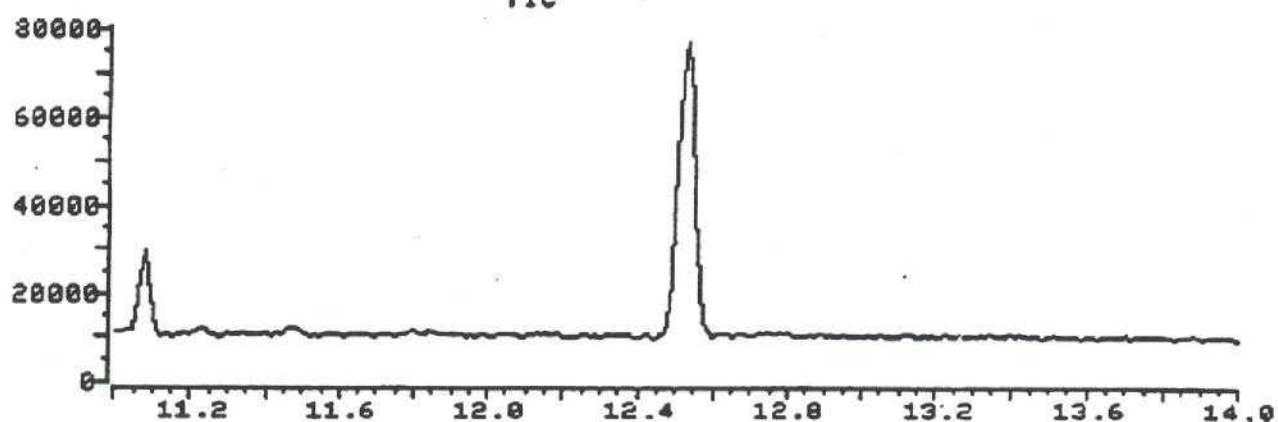


Figure 1. GC/NPD chromatogram of elemental phosphorus (0.015 mg/l).

File >TES16 . 25.0-500.0 amu. p4 std 15ppm
TIC

hp-1



File >TES16
Bpk Rb 46296.

p4 std 15ppm
SUB

hp-1

Scan 802
12.52 min.

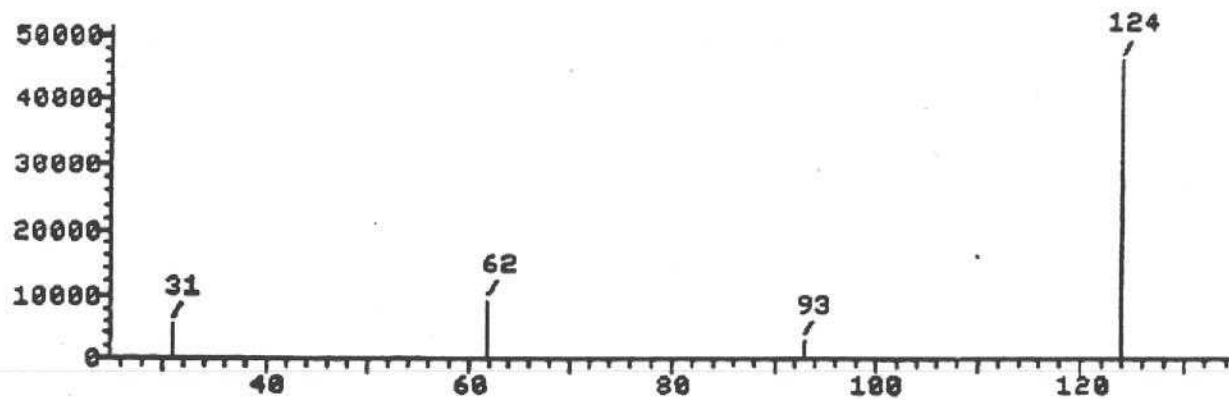


Figure 2. GCMS total ion chromatogram (top) and mass spectra (bottom) of elemental phosphorus (15.0 mg/l).

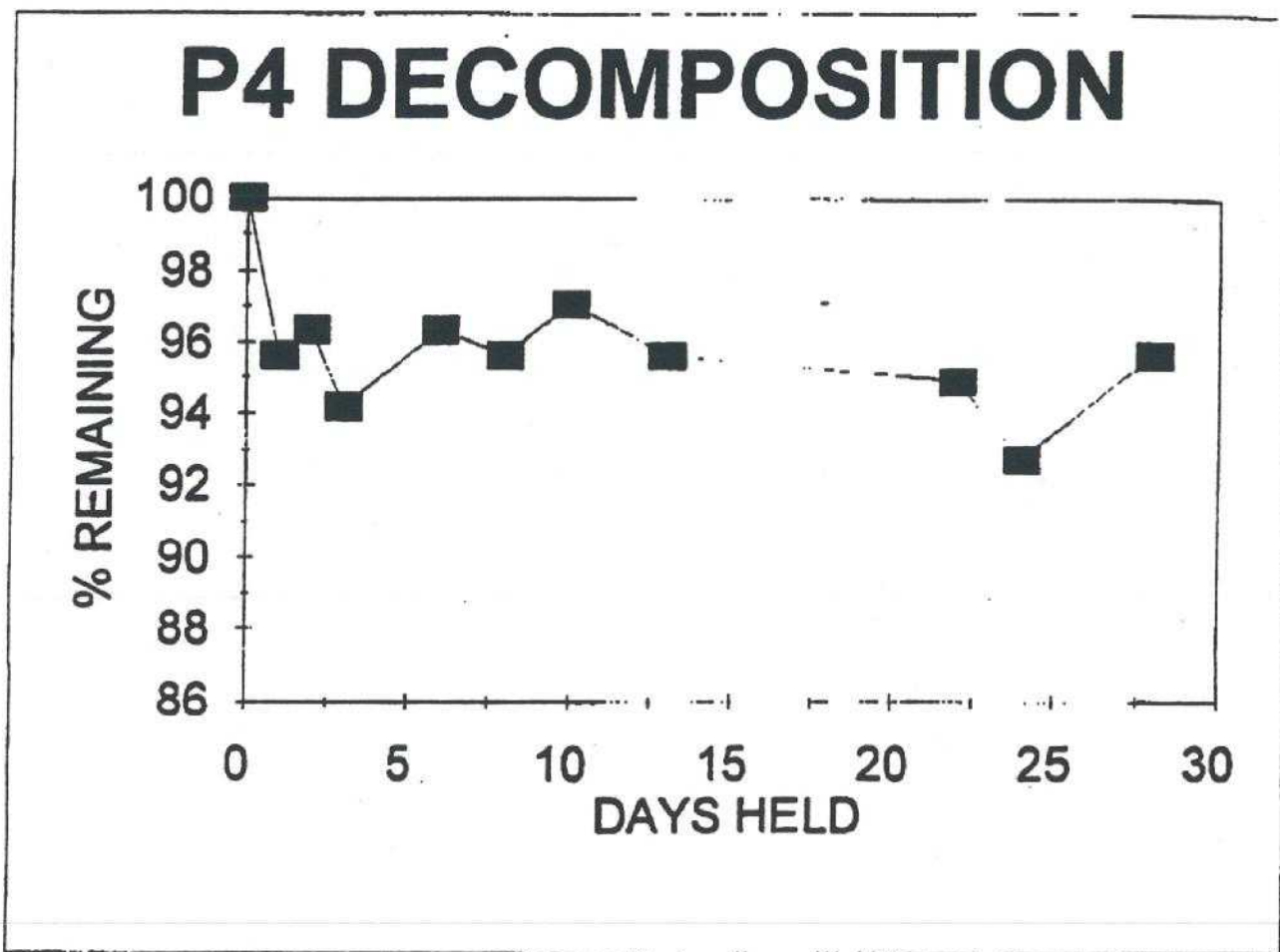


Figure 3. Elemental phosphorus stability curve.

Appendix A: FMC GC/NPD Phosphorus Method

FMC CORPORATION
PHOSPHORUS CHEMICALS DIVISION
POCATELLO PROCESS CONTROL LABORATORY

Analytical Method K-9A
Water
Method for Elemental Phosphorus
By Gas Chromatography

February 6, 1973
Revised June 24, 1976
Revised November 12, 1991

Based On

D. E. Rushing, "A Tentative Method for the Determination of Elemental Phosphorus in Air", American Industrial Hygiene Journal, September-October, 1962, p. 383.

E. R. Kaelble, "Gas Chromatographic Determination of Elemental Phosphorus in Air", Special Report No. 7781, Monsanto Company, Research and Development, St. Louis, Missouri.

Development work at the Pocatello Control Laboratory.

Principle

Elemental white phosphorus is almost insoluble in water (one part in 300,000 parts of water); and soluble in xylene (>1000 ug/ml). Therefore, elemental phosphorus both dissolved and suspended may be extracted from water using xylene. The xylene solution is injected into gas chromatograph equipped with a flame ionization detector with nitrogen-phosphorus accessory. Phosphorus elutes as a sharp peak in less than 1 minute. Peak height is linearly proportional to phosphorus concentration.

Safety

Xylene is considered a moderate health hazard and a severe flammability hazard. This material should be handled in a hood or in adequate ventilation and proper gloves, safety glasses and lab coat should be used to minimize exposure.

Elemental phosphorus is rated as a severe health and flammability hazard. Use safety glasses, face shield, rubber gloves and apron when handling the solid phosphorus in preparing the standards.

Precision and Accuracy

The detector has been checked for specificity using phosphine and various phosphate salts which gave no response.

Analytical Method K-9A

Page 3

Procedure

Low part per million solutions of elemental phosphorus in water are unstable and rapidly oxidize. The following extraction must be done in the field immediately after the sample is taken. Transfer a measured volume of the water sample, <400 ml, to a 500 ml separatory funnel. Add 20 ml xylene and shake for 5 minutes, relieving the pressure periodically. Allow the layers to separate and drain off the water layer, and discard. Filter the xylene layer through phase separation paper. Collect the xylene into a glass vial and cap. This solution will be stable for at least two weeks.

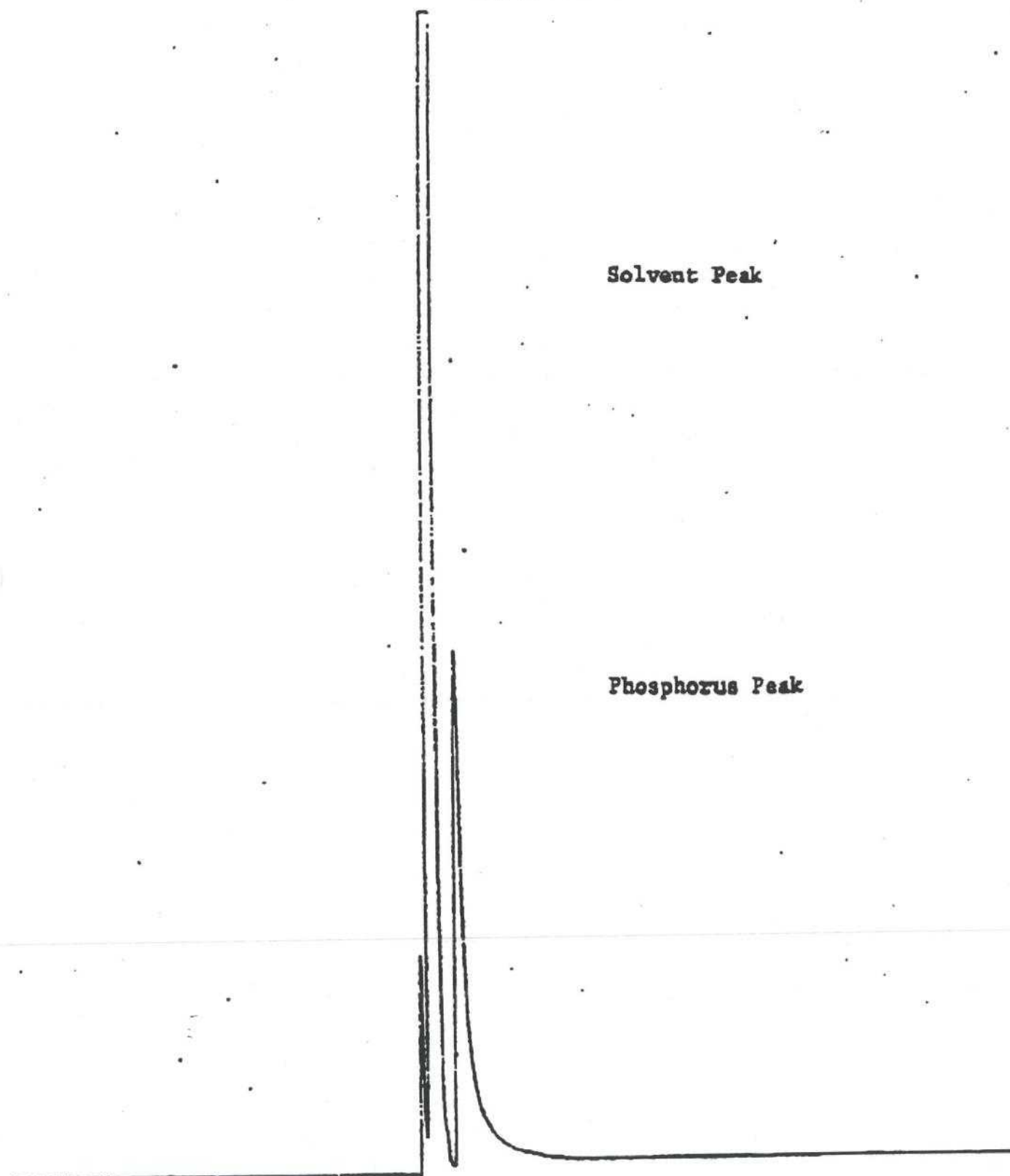
Condition the detector by injecting 0.5ul of the 15 mg/l standard twice into the chromatograph. The phosphorus peak elutes after the solvent peak at approximately 40 seconds. A typical chromatogram is seen in Figure I. Standards must always be run with the samples as detector response varies from day to day. The attenuation and amplifier range setting will influence the peak heights. By varying these settings, the response of the detector can be kept within the scale of the recorder. The standard run will have to correspond to the concentration of the samples. Measure the peak heights and prepare a calibration curve. Inject the sample solution and read the concentration from the calibration curve.

Calculations

$$\text{ppm P} = \frac{\text{Micrograms P from Calibration Curve} \times 20}{\text{ml sample}}$$

CDH:na

Figure 1 A Typical Phosphorus Chromatogram



Analytical Method K-9A
Page 2

Repeated runs on the same xylene extract gave the following results.

<u>Average</u>	<u>Standard Deviation</u>
0.49 ppb	+0.06
0.135 ppm	+0.0045
8.13 ppm	+0.19

Reagents

Xylene: Reagent grade.

Standard Phosphorus Solutions: Carefully prepare a stock solution of phosphorus in xylene as follows: Place an approximately 1.5 gram piece of phosphorus in acetone to dissolve the water. Dry off the acetone and quickly weight the phosphorus in a nitrogen filled container. Quickly transfer the sample to a 1000 ml volumetric flask containing xylene. Dissolve and dilute to volume. From the stock solution, prepare standards covering the range of interest by making quantitative dilutions from xylene. Our standards covered the range 0.02 to 15 ug/l. Standards, if stored in the dark, are stable for over 4 months.

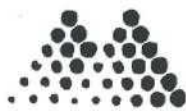
Special Apparatus

A Perkin-Elmer Model 990 Gas Chromatograph equipped with a flame ionization detector with nitrogen-phosphorus accessory was used for the elemental phosphorus determinations. The conditions are listed below.

Column	Alltech C-5000 668899L 6 ft. x 1/8" x 0.085" stainless steel packed with Ultrabond 205R 100-120 mesh. Precondition the column @ 115°C overnight
Column temperature	100°C
Injector temperature	210°C
Manifold temperature	300°C
Detector power supply	Detector Engineering & Technology 12-1403 operating setting 3420
Recorder	Kipp & Zoner BD40
Helium flow	15 ml/min
Hydrogen flow	4.2 ml/min
Air Flow	50 ml/min

Hamilton one microliter syringe #7001SN
Whatman IPS phase separating paper 12.5 cm diameter
Glass vials 20 ml with foil lined lids

Appendix B: Microextraction Field Sampling Method



Mountain States Analytical

The Quality Solution

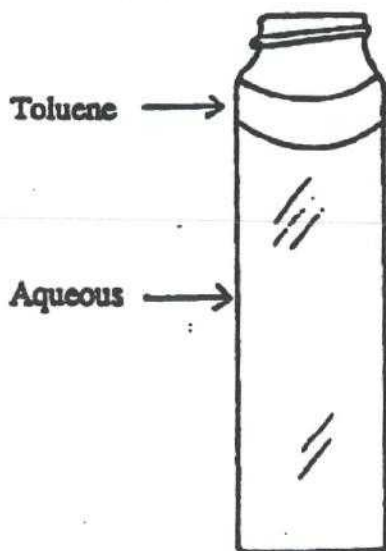
A Field Method for collecting groundwater samples for elemental phosphorus analysis

*for Jeff Cross - Hydrometrics
September 9, 1992*

Obtain duplicate 40 ml amber vials which have been prepreserved with exactly 2 ml toluene for groundwater well samples which will be analyzed for elemental phosphorus (P_e).

Fill the vial with sample to the approximate center (or halfway through the curvature) of the neck of the vial according to the illustration below. This allows for a small air space for agitation (microextraction). Two liquid layers should be observed as the aqueous sample is introduced into the vial. The toluene solvent will be the top layer. It is important to avoid loss of the solvent during the sample collection step, i.e. don't overfill the vial. If this occurs, obtain another vial and repeat the collection step correctly. MSAI has determined there to be a maximum of 0.7% difference in volume by filling the vials in this manner. Each vial will contain approximately 37 ml of sample and exactly 2 ml of toluene.

Cap the vial tightly and agitate by inverting and shaking rapidly for 30 seconds to one minute. Wrap vial in protective material (such as bubble wrap) and pack in cooler at 4°C for shipment to MSAI. Each sample source shall be collected in duplicate.



Microextraction sample vial w/o cap
(3/4 actual size)

**Appendix C: Raw Data for FMC's Analysis of
MSAI's Calibration Standards**

**Appendix D: 9206 Ground Water Chains of Custody
and Analyses Log**



Mountain States Analytical

The Quality Solution

Sample Chain of Custody

W.O.No.:			Project Name:		Number of Containers							Remarks	
Sampler:													
Sample Number	Date	Time	COMP	GRAB	Station Location								
①	6-18-92	0910		X	EMC. GUL. 9204 - 219	1							
②	" "	1040		X	" " " 220	1							
③	" "	1345		X	" " " 223	1							
④	" "	1515		X	" " " 221	1							
⑤	" "	1755		X	" " " 224	1							
⑥	" "	1850		X	" " " 225	1							
⑦	" "	2000		X	" " " 226	1							
⑧	" "	2050		X	" " " 227	1							
⑨	" "				XYLONE BLANK	1							
Sample Relinquished by:			Date	Time	Sample Received by:	Date	Time	Reason for Transfer					
C. P. H.			6-19-92	1425									



Sample Chain of Custody

1645 West 2200 South, Salt Lake City, Utah 84119 (801) 973-0050 FAX (801) 972-6270

25 Jun 92 11:54 AM

page 1

Sequence: C:\HPCHEM\1\SEQUENCE\PHOSTEMP.SEQ

Operator: KAR

Sequence preparation date: 25 Jun 92 11:54 AM

Data File Subdirectory: 25JUNPHS

Part of methods to run: full method

On a barcode mismatch: inject anyway

Comment:

P4 SAMPLE ANALYSIS ON NPD SYSTEM

Sample Table

Vial Num.	Sample Name	Sample Amount	Multiplier	ISTD Amount
1	TOLUENE			
2	P4 0.015			
3	P4 0.15			
4	P4 1.5			
5	P4 15			
6	TOLUENE			
7	OCS 1.15 P4			
8	TOLUENE			
9	1-9206-219			
10	2-9206-220			
11	3-9206-223			
12	4-9206-221			
13	4-9206-221 DUP			
14	TOLUENE			
15	5-9206-224			
16	6-9206-225			
17	7-9206-226			
18	8-9206-227			
19	9-XYLENE BLANK			
20	10-FMC 0.248 PPM			
21	11-FMC 2.067 PPM			
22	12-1A XYLENE EXT			
23	13-4A XYLENE EXT			
24	14-XYLENE BLANK			

SECTION I, ATTACHMENT 2

APPENDIX C

**RCRA/CERCLA MEMORANDUM OF UNDERSTANDING
FOR EASTERN MICHAUD FLATS**



April 19, 1991

MEMORANDUM

SUBJECT: RCRA/CERCLA MOU for Eastern Michaud Flats

FROM: Bill Adams *BA*
Project Manager

TO: Philip G. Millam, Chief
Superfund Branch

Mike Gearheard, Chief *MG*
Waste Management Branch

THRU: Catherine Krueger, Chief *CK*
Site Management Section III

Carrie Sikorski, Chief
RCRA Permit Section

Attached for your concurrence/signature is an agreement developed for the Eastern Michaud Flats Superfund site to better coordinate the Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) issues. Following is a brief background on the site.

The Eastern Michaud Flats Superfund site consists of two operating facilities, FMC and Simplot. As a result of a change in the mining waste exclusions, FMC became subject to RCRA last year (Currently Simplot's wastes are not subject to regulation under RCRA). As a result in this change in regulation, FMC recently submitted its part B application for the newly regulated wastes and units. They have also installed a number of wells to meet the RCRA groundwater monitoring requirements.

In January, FMC and Simplot were issued a Consent Order for conducting a Remedial Investigation/Feasibility Study (RI/FS) for the site. Negotiations on this order and the RI/FS Scope of Work will begin in the next few weeks.

Last fall, representatives of FMC met with EPA to request that there be some sort of coordination between the RCRA and CERCLA programs. It was agreed by EPA that the situation was unique and a special effort was required in order to avoid duplication between the RCRA and CERCLA programs. In order to facilitate communication, we have drafted the attached Memorandum of Understanding (MOU) between the two EPA programs. We have also set up a Steering Committee to discuss and coordinate the various program activities for this site. This committee has

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representatives of EPA (RCRA & CERCLA), the State of Idaho, the Shoshone-Bannock Tribe, and FMC.

It is important to note it is fairly unique to have an operating RCRA facility also on the NPL and subject to CERCLA. It is because of this situation that the attached MOU was developed. In general, such an agreement would not be necessary for other non-RCRA Superfund sites.

Please call me at (206) 553-2806 if you have any questions or concerns regarding the MOU, or the site in general.

cc: Dave Croxton, WMB
Cyndy Mackey, ORC
Philip Millam, Superfund

Region 10 Memorandum of Understanding
Between the RCRA Program and the CERCLA Program
Regarding Coordination of Remedial Activities at
the Eastern Michaud Site

This memorandum is written to outline the process by which the Region 10 RCRA Program and the CERCLA Program will coordinate their regulatory activities at the Eastern Michaud Site during the RI/FS study activities at FMC.¹

It is agreed that the RFI and RI/FS study activities will be completed under one agreement, to the extent possible, which is entered into under CERCLA. CERCLA will have the lead for conducting the RI/FS, or overseeing the PRPs, and coordinating the involvement of the RCRA and CERCLA programs during the RI/FS. It is believed that the broad remedial authorities of CERCLA can meet the remedial requirements under RCRA. This is consistent with the guidance provided in the RCRA Orientation Manual dated 1990 and the RCRA proposed corrective action rules dated July 27, 1990 (55 Fed. Reg. 30798).²

¹ The policy and procedures set forth herein are intended solely for the guidance of the U.S. Environmental Protection Agency. They may not be relied upon to create a right or benefit, substantive or procedural, enforceable at law or in equity by any person. The Agency may take any action which is at variance with the policies or procedures contained in this memorandum.

² "EPA anticipates that the two programs will arrive at similar solutions to similar environmental problems, and that actions undertaken by one program will be adopted by the other program in cases where the programmatic responsibility for a site shifts from one to the other. Specifically, the Agency anticipates that there may be a number of facilities at which substantial CERCLA remedial studies and/or actual remediation will have been already conducted at the time a RCRA permit is issued (thereby triggering the Subpart S corrective action requirements). This situation is likely to be most common at Federal facilities. In such cases, if the remedial work has been conducted according to the CERCLA NCP, EPA would consider that work to be consistent with the requirements of subpart S, and therefore additional or different studies or cleanup requirements would be unnecessary. If, however, the remedial activities conducted pursuant to the NCP at a RCRA facility addressed only a portion of the units or releases at the facility requiring remediation, the permit would address any such remaining corrective action requirements pursuant to subpart S." 55 Fed. Reg. 30852 (July 27, 1990).

The RCRA requirements which must be considered during the CERCLA RI/FS include the RCRA Facility Assessment (RFA) and the RCRA Facility Investigation ("RFI"). The RFA is an Agency-conducted assessment, which is analogous to the Superfund Preliminary Assessment/Site Investigation ("PA/SI"). However, the RFA identifies each solid waste management unit at the facility and evaluates the potential for release of hazardous constituents on a unit-specific basis. The RFI is comparable to the Remedial Investigation in the Superfund program. See 55 Fed. Reg. 30810 (July 27, 1990). See also RFI Guidance. In addition, a number of the RCRA requirements associated with FMC's Part B application may be incorporated into the CERCLA process. Both programs will coordinate these requirements as follows.

A. RFA

In accordance with the RCRA Facility Assessment Guidance, the RCRA program will utilize the findings of the Superfund PA/SI to help develop the RFA. Any additional information collected during the RFA will be coordinated with the CERCLA process. A site visit may be necessary in order to complete the RFA. The CERCLA program will review and comment on relevant RFA documents. These comments will be incorporated into the final RFA where appropriate.

B. RFI

In accordance with the RCRA Corrective Action Rules and the RFI Guidance, the RCRA Program recognizes that the requirements for the RFI can be satisfied by a CERCLA Remedial Investigation ("RI"). The RCRA Program will review and comment on relevant RI documents. The RI will incorporate these comments where applicable or relevant and appropriate. Any issues that can not be resolved at the staff level will be raised through the normal Hazardous Waste Division chain-of-command. If it is agreed that certain RFI needs will not be addressed by the RI, then the RCRA permit will incorporate the necessary RFI requirements. However the goal is to fully incorporate the RFI into the RI.

C. RCRA Compliance

The RCRA Permit Project Manager will keep the CERCLA Project Manager informed about RCRA activities at FMC, including notifying the CERCLA Project Manager prior to initiation of any proposed remedial activities under RCRA. The Project Managers will meet to determine how these remedial activities can be integrated into the CERCLA activities. The RCRA compliance program will continue to perform site inspections and undertake necessary enforcement activities. Significant findings from these inspections will be made available to the CERCLA Project

Manager.

The information gathered for FMC's Part B application should be incorporated into the CERCLA process including information relating to the following:

- Characterization of site hydrogeology and certification of compliance with groundwater monitoring requirements.
- Compliance with financial responsibility requirements.
- Information regarding on-site waste management.
- Management/Operation including:
 - Groundwater
 - Closure/Post Closure
 - Financial Assurance
 - Engineering plans to upgrade the facility
 - Minimum Technology Requirements (MTR)

The CERCLA Project Manager will be responsible for identifying Applicable or Relevant and Appropriate Requirements (ARARs) relating to the RCRA program and for keeping the RCRA Project Manager as well as other members of the Steering Committee informed of such determinations in a timely manner.

D. Corrective Action

Most remedial activities will likely occur after a ROD is signed. If early corrective action under RCRA is necessary during the RI/FS activities, it could be performed as an Interim Remedial Action or Removal, unless it is beyond the scope of the CERCLA process. If necessary it could be imposed as a RCRA interim stabilization measure upon concurrence of the RCRA and CERCLA programs.

This MOU recognizes that the Feasibility Study and the ROD may consider the possibility of undertaking some of the agreed upon remedial activities at FMC as part of the RCRA corrective action program. The FS and the ROD will require the review and concurrence of both the RCRA Program and the CERCLA Program.

E. Steering Committee

A Steering Committee will be formed to facilitate coordination of the various legal requirements (including RCRA requirements) with the CERCLA activities at FMC. It is anticipated that the committee will contain a representative of the EPA RCRA program, a representative of the Shoshone-Bannock Tribe, a representative of the State of Idaho, a representative

of EPA's Idaho Operations Office, a representative of the RCRA Facility (FMC at this time), and a representative of the EPA CERCLA program. The members of this Steering Committee would present any site characterization or remediation needs deemed necessary by their individual programs to the Steering Committee for discussion as to how these needs can best be addressed during the RI/FS activities. As the RI/FS activities begin to explore alternatives, the Steering Committee would be instrumental in ensuring that the alternatives considered meet the needs of the various regulatory programs.

F. Negotiations with PRPs

The CERCLA program will have the lead in the negotiations with the PRPs for conducting the RI/FS. The RCRA staff will be involved as a member of the Steering Committee in verifying information supplied by the PRPs and any discussions regarding particular RCRA units and their incorporation into the RI/FS.

Do not remove